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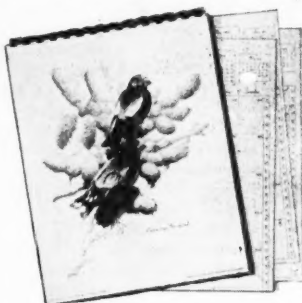
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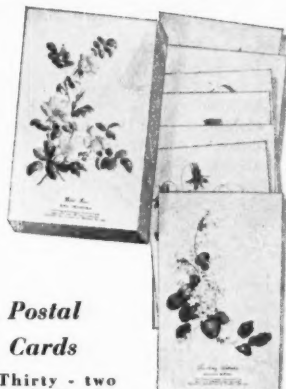
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# Nature in Print

By HOWARD ZAHNISER

Not long ago, during an informal session at the National Audubon Society's annual convention, I suggested, rather whimsically, that some of us ought to organize a Junior Audubon Society Alumni Association, supporting, like all good alumni, the grade-school institution that brought to so many of us our first experiences in ornithology, and in Nature education and conservation. I was thinking of my own debt to the fifth-grade club that Miss Evelyn Spencer conducted in Ellwood City, Pa., some x years ago—to which I alluded once before on this page.

Before the day was over, Bob Allen, whose great story of his studies and adventures with the roseate spoonbills, *The Flame Birds*, was recently published (Dodd, Mead & Co., \$3.50), "joined up," telling me of his first interest in birds in Williamsport, Pa., Junior Audubon group. Just a bit later who should appear as a third member but Roger Tory Peterson, with reminiscences of his early Junior Audubon associations in Jamestown, N. Y.

It became rather impressive to me, and I have since enjoyed very much ruminating the prospect. So far there has been no expansion of which I am aware beyond the trio. That leaves me alone in remarkably excellent company. Bob Allen (Robert Porter Allen on a title page) wrote one of the really excellent bird books of 1947—a book that was at the same time a record of human adventure in the almost unexplored coastal areas of Florida and Texas, a brilliant and informal story that was well titled *The Flame Birds*. Here now, by Roger Peterson, is one of the outstanding bird books of many a year, a volume entitled *Birds Over America* that is at once surprising and delightful and deeply satisfying. Thinking back to my early bird-watching days, I can well realize what an eager expectation for the future I would have had could I have realized that fortune would associate me with such authors. I can well appreciate the value of the increasingly numerous junior bird clubs to the children of today, and with them I can be thankful for the wealth of good books that we have.

It is easy thus to become somewhat reminiscent in thinking about *Birds Over America*, for essentially the volume is Mr. Peterson's record of the experiences that he has had in a life-long quest that has been both sport and profession. The book eludes classification as autobiography, however, for the subject seems always to be not the author but the birds he has pursued, and the people with whom he has traveled. One could read it without realizing that its author is one of the outstanding bird artists of all time, and without sensing that tens of thousands of people are possessors of his illustrated bird guides, which have revolutionized the art of bird watching. Knowing these facts, one values the book all the more, and enjoys, too, the surprise in perceiving what a great photographer this painter is—and what an excellent writer.

In a "Photographic Postscript" Mr. Peterson explains that the

hundred or so photographs in the book have been "selected from more than ten thousand" that he has taken during the past twenty years. He testifies to enjoying photography more than "anything else that I do with birds." (It is not "as grim a proposition" to him as his painting.) And he shares with his readers the secrets of his technique, relating his various practices to the illustrative examples included in the book. The photographs themselves are superb, clear delineations of the birds pictured but at the same time highly satisfying compositions and brilliant revelations of the beauty of light, and the beauty, too, of pattern and outline. In this choice of the hundred from the ten thousand—if not in all his photography—Mr. Peterson has shown the same exquisite neatness that has always seemed such a distinctive quality of his paintings. The photography of *Birds Over America* is thus something more than illustration, a feature of intense intrinsic interest.

Nevertheless, the text is the book, and it is high praise to testify that what Mr. Peterson here writes has an interest that is dominant even over these photographs. Mr. Peterson's bird

studies have taken him into distant and diverse habitats—into forty-seven of the forty-eight States, he says. Obviously he has had many rich experiences. "Such deeply felt pleasures," he says, "are hard to share," but he attributes his book to a long-time wish for some sort of sharing, at least.

"I have wanted, for a long time," he writes, "to put on paper my impressions of some of the different facets and sidelights of the world of birds and to describe some of the ornithological spectacles I have seen." This he does in *Birds Over America*, but he also describes in terms of his own experiences just what the activities of a bird watcher are, and in terms of his own associations he tells who the great bird watchers of our times are. Add to these ingredients a modicum of philosophical reflections and a dash of conservation ethic, and you have the makeup of the work. As to its manner, one may say that each of its twenty-five chapters is an independent "article" characterized by personal narrative, by high regard for what is known as human interest, and by a wealth of anecdote—a readiness, for example, in remembering that Lee Jaques once remarked that "The difference between warblers and no warblers is very slight," or that Joseph Hickey said that

bird watching is by some people "regarded as a mild paralysis of the central nervous system, which can be cured only by rising at dawn and sitting in a bog." The book is a light-hearted yet serious, casual but earnest, series of chronicles—some of them topical, in which various experiences relating to such activities as compiling lists or making censuses are gathered together, some of them episodes of exploration, others narratives relating to certain birds or groups of birds, and still others given a unity by attention focused on personalities. The volume's diversity could be indicated only by a table of contents, but it may be further suggested by the speculation that it could well stand by itself as a testimony to future generations, or to distant foreigners, of what popular ornithology has been among us Americans during the past quarter-century.

Mr. Peterson's volume, and the later ones we are eager to expect, should still further popularize an interest in birds, even as his guides and his paintings have in the past. That there has already been a phenomenal increase in such interest is one of the observations emphasized in *Birds Over America*, empha-

## To a Rubythroats

By RUTH SEYMOUR VESELY

A wisp of feathered emerald,  
You probe with slender bill  
For nectar in the fuchsia bells  
With such unerring skill  
The pendant flowers barely stir;  
Then, helicopter-wise,  
You pause in midair, whirring wings  
Too fast for human eyes,  
And make a landing on a wire  
As if it were a shelf,  
And there you calmly sit and preen  
Your cocky, three-inch self.

Although you seem so frail and sweet,  
I know that when I dare  
To stroll about my garden  
You resent my presence there,  
And zing past my defenseless head  
Or scold like any shrew . . .  
Pugnacious little postage-stamp,  
There's surely room for two!



sized and appraised. Mr. Peterson has seen "a tremendous Renaissance in nature study," and he makes a most interesting and stimulating comment:

"Some," he writes, "would say this is a form of escapism and perhaps it is, in a way—but not an escape from reality; rather a flight from unreal things—from the 'sommambulism of the hive' as Louis Halle calls it. In this gadget civilization which man has built to insulate himself against the world, he finds himself entrapped, not knowing whence he came or where he is going. Halle, in his *Spring in Washington* (a book that no reader of this page should miss—H. Z.) observes that 'it becomes necessary, occasionally, simply to throw open the hatches and ventilate one's psyche, or whatever you choose to call it. This means an excursion to some place where the sky is not simply what you see at the end of the street.'

"We invent systems," Mr. Peterson continues, "Socialism, Fascism, Communism and Capitalism. Each despises the other. Yet, as Professor Aldo Leopold of the University of Wisconsin pointed out, they all espouse one creed: *salvation by machinery*. Is it any wonder that when these systems prove faulty and men detect the synthetic nature of the civilization of their devising they turn to nature? In a world that seems to have gone mad is it any wonder birds have such appeal? Birds are, perhaps, the most eloquent expression of reality."

Elsewhere in *Birds Over America*, in its "Foreword," Mr. Peterson observes that "one cannot give a large share of his life to this carefree hobby without soberly reflecting on the mechanics of the well-integrated world of nature. One inevitably," he declares, "becomes a conservationist."

These considerations, I suspect, will become the dominant concern of the Junior Audubon Society Alumni Association if it ever becomes articulate—this contemplation of birds as "the most eloquent expression of reality," this reflection on the "well-integrated world of nature," the effort that Bob Allen refers to in *The Flame Birds* to "relate the life of a wild bird to the earth of which we are a fellow resident," and the inevitability of becoming a conservationist. Certainly a present awareness of these concerns is among the reasons for gratitude felt by those of us who in our early years had the good fortune to be introduced to the fascinating avifauna of our world. And the encouragement of similar projects among the children of today is one of our benevolent gestures toward the men and women of another day, even as the propagation of such a work as *Birds Over America*—or *The Flame Birds*, or *Spring in Washington*—is part of our generous interest in our own fellow men.

*Birds Over America*. Illustrated with 105 photographs by the author. By Roger

Tory Peterson. New York: Dodd, Mead & Company. 1948. 342 pp. (7 by 10 in.) with index. \$6.

### Golden Mother Goose

*The Golden Mother Goose*. Illustrated in color by Alice and Martin Provensen. 96 pages. New York. 1948. Simon and Schuster. \$1.50.

This is one of the Giant Golden Book series and certainly a lovely and alluring edition of Mother Goose. There are 367 childhood favorites illustrated by the artists, and this definitely is tops among the new versions of these immortal verses.

### Physical Geology

*Physical Geology*. By Chester R. Longwell, Adolph Knopf and Richard F. Flint. New York. 1948. Third Edition. John Wiley and Sons. 602 pages. Illustrated. \$5.00.

For more than fifteen years this geology has been a standard college textbook in physical geology. As a result of this long use, and suggestions inspired by the first two editions, this third and revised edition has been brought out. A new unit has been added and the entire text subjected to critical analysis and change.

### Essays in Science

*The Life of Science*. By George Sarton. New York. 1948. Henry Schuman, Inc. 197 pages. \$3.00.

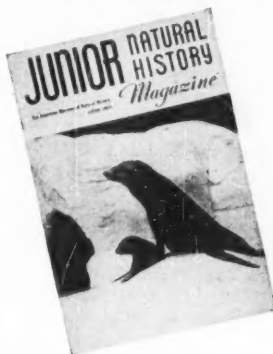
This is the keynote volume in The Life of Science Library, a new series the guiding principle of which is "the idea that science can be rightly called 'the domain of reason'—and that a knowledge of its history is central to any effort to understand our civilization." Dr. Sarton is an Associate of the Carnegie Institution of Washington and Professor of the History of Science at Harvard University, and this book of essays is distilled from his writings over a period of thirty years. They bring to life men like Harvey, Napier, vonHumboldt, Comte, da Vinci, Galois, Renan and Spencer in a delightful essay style, which in itself is a notable contribution to the art of the essay.

### Income on the Side

*Making Money at Home*. By Earl B. Shields. Published by the Author, 107 West Wacker Drive, Chicago 1, Illinois. 64 pages. Illustrated. \$1.00.

This is a compilation of sixty-three interesting projects from which one may, if fortunate and diligent, and, in some cases, patient, make some sideline money at home. Quite a number of the suggestions have a Nature relationship, such as raising hamsters, growing mushrooms, breeding canaries, and culturing earthworms. Setting aside the possible money income that might be derived, many of the suggestions have a hobby interest as well.

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## IN THIS ISSUE

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Vol. 42, No. 1

Seahorses.....	Fredric Sweney	Cover
Nature in Print.....	Howard Zahniser	2
To a Rubythroat (Poem)	Ruth Seymour Vesely	2
A Kingdom for Wild Horses	Barney Schwartz	9
The Good Earth Strikes Back.....	Ernst Behrendt	13
"And Bright Stars" (Quiz)	Mabel Irene Huggins	16
Dragonfly Man	Lorus J. and Margery J. Milne	17
Curious Dragonroot.....	Edwin F. Steffek	19
Can a Squirrel Be Hurt by a Fall?....	W. L. M.	19
The Starfish.....	Muriel Lewin Guberlet	20
Miracle at Altamira.....	Edwin D. Neff	22
Life with Bongo.....	Hugh Sterling Davis	25
The Serpent's Tongue.....	Walker Van Riper	30
Woods in Winter (Poem).....	Paul H. Oehser	32
Chinese Vegetables.....	Andrew S. Wing	34
Suggestion (Poem)	Jon, Karin and Lief Ahrens	36
The Oregon Myrtle.....	Janet Moore	37
Lost and Found (Poem).....	Reba Gober Ford	38
Mister Boomer—Collared Lizard	James G. Harlow	39
Portrait of My Grandfather (Poem)	William Arnette Wofford	40
The Heavens in 1949.....	Isabel M. Lewis	41
What if the Dawn.....	Mae Winkler Goodman	42
Classroom Conservation.....	Herman Quick	43
The School Page.....	E. Laurence Palmer	45
Buckeye Fruit (Poem).....	T. W. L. Scheltema	45
Camera Trails.....	Edna H. Evans	46
Under the Microscope.....	Julian D. Corrington	54

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## The Fairchild Garden

*Fairchild Tropical Garden.* By Lucita H. Wait. New York, 1948. The Ronald Press Company. 381 pages. Illustrated. \$3.00.

Dr. David Fairchild and those associated with him are building the Fairchild Tropical Garden at Coconut Grove, Florida, for the future. However, the work and development have gone on long enough—a decade—to warrant an interesting stock-taking of progress thus far. This is precisely what this volume represents. It is at once a history of the enterprise and a report on the Garden as it is today, together with a glance forward. It is not a descriptive story of the Garden, although descriptions of its plantings do appear, but, rather, a compilation of what the Garden has done, facts about its expeditions, its distinguished friends, its educational activities, its publications, and its great director.

## Mathematics History

*A Concise History of Mathematics.* By Dirk J. Struik. New York, 1948. Dover Publications. Vol. 1, 123 pages; vol. 2, 299 pages. Illustrated. \$1.50 per volume; \$3.00 the set.

"Mathematics is a vast adventure in ideas; its history reflects some of the noblest thoughts of countless generations," says Dr. Struik, professor of mathematics at Massachusetts Institute of Technology, in his introduction to these two small volumes, which amazingly condense the history of mathematics. The first volume covers the story from Oriental civilizations to the Seventeenth Century, and the second volume brings the reader down to date.

## Colour Books

*Garden Flowers.* By Robert Gatherne-Hardy, with plates by Jane London. New York, 1948. B. T. Batsford. Ltd. \$2.00.

*Tropical Birds.* By Sacheverell Sitwell, with plates by John Gould. New York, 1948. B. T. Batsford. Ltd. \$2.00.

The two attractive volumes are listed together because they are both "Batsford Colour Books," and the second and third in what is intended as a series with emphasis on color. Sixteen full-color plates appear in each book, supplemented by notes and descriptive text.

## Garden Primer

*Learning to Garden.* By Olive Mason Gunnison. New York, 1948. Funk and Wagnalls Company. 388 pages. Illustrated. \$2.85.

This latest addition to the list of practical garden books starts the new gardener practically from scratch, presenting garden facts and advice in simple terms. The author is a practical gardener

herself, and a newspaper and magazine writer on garden subjects.

## Dog Care

*Care of the Dog.* By Will Judy. Chicago, 1948. Fourth Edition. Judy Publishing Company. 92 pages. Illustrated. \$1.75.

This fourth edition of Will Judy's practical and helpful guide to the care of the dog has been revised, and presents in 41 chapters a multitude of suggestions and a wealth of advice to the dog owner.

## Maine Ferns

*The Ferns of Maine.* By Edith Bolan Ogden. Orono, Maine, 1948. University Press. 128 pages. Illustrated and with end-map. \$1.00.

One in the second series of University of Maine Studies, this is an important contribution to regional fern literature. It is of interest to the systematic botanist and the specialist in ferns, not to the casual, lay student.

## Activity Ideas

"Outdoor Activities for In-Town Groups," this is the title that the Rafter Crafters, P.O. Box 97, Pleasantville, New York, give to their second portfolio of program suggestions. This organization with the provocative name is the *nom de commerce* of that versatile and resourceful trio, Margaret Chapman, Marie E. Gaudette and Catherine R. Hammett. The first portfolio, which was titled "Program Helps for Camp Leaders," was enthusiastically received and brought many ideas for inclusion in a second portfolio. These have been combined with the authors' own projects into a most helpful source of activity suggestions. For any youth leader this is a real fifty cents' worth.

## To Know Fish

*A Study of Fish.* By Chapman Pincher. New York, 1948. Duell, Sloan and Pearce. 343 pages. Illustrated. \$4.00.

If one wishes to know how fishes swim, see, breathe, sense, breed and otherwise carry on their moist existence, this is the book to provide the information. The text is presented clearly and interestingly, in the language of the layman but with scientific authority. Fishermen, students and naturalists should all find it an extremely valuable volume.

## Fish Names

"A List of Common and Scientific Names of the Better Known Fishes of the United States and Canada" is the full and descriptive name of a 45-page pamphlet published by the American Fisheries Society and is available for twenty-five cents from Dr. William C. Beckman, Museums Annex, Ann Arbor, Michigan.

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## BRITISH RAILWAYS

## JENNER'S CUCKOO

By JOHN PATRICK O'BRIEN

The following is a brief account of a remarkable ornithological discovery, made a century and a half ago, by the famed English country doctor, Edward Jenner, M.D., F.R.S. (1749-1823). Jenner is deservedly immortalized in the annals of medicine as the man who discovered smallpox vaccination. He thereby gave to the world the means of eliminating from the long list of human ills that giant of loathsome and dreaded diseases, which, prior to his discovery, had numbered its victims, in death, blindness and disfigurement, literally in the millions. It would be hard to overestimate the debt of gratitude which the world owes this unselfish and truly humble country physician.

It is, however, not so generally known that, in addition to his medical accomplishments, Jenner was a naturalist of considerable distinction. Indeed, had he contributed nothing more, scientifically, during his life than his work in natural history he would have justly merited fame. His reputation as a naturalist rests principally on his observations in the realm of ornithology. This work he sandwiched in amidst his busy and devoted hours of medical practice. His idol, teacher and friend, the renowned English surgeon, John Hunter, who was also deeply interested in natural history, had requested Jenner for a first-hand account of the activities of the cuckoo. Jenner set himself to the task.

It was generally known, in Jenner's time, that the female of some species of cuckoos regularly builds no nest; rather, she deposits her eggs (unceremoniously enough!) in the nests of other birds. It was also known that in such shared quarters the young rightful tenant (or tenants) was mysteriously "liquidated"! The young cuckoo remains as sole survivor and master of its ill-acquired abode. How this eviction was accomplished was unknown until Jenner's startling discovery. It had been thought by some that the parent cuckoo was in some manner or other responsible for the elimination of the rightful occupants of the nest. Jenner directed his attention to young cuckoos, which had hatched in the nests of the hedge-sparrow, a favorite choice of nest with the female cuckoo in Jenner's home district of Berkley. Generally the cuckoo egg bears a distinct likeness to the eggs that rightfully occupy the nest, but, by way of exception, the cuckoo egg found in the hedge-sparrow nest bears no resemblance to the eggs of the host. (The hedge-sparrow is apparently a very unsuspecting and accommodating creature. Jenner, on one occasion, placed a large black-bird egg in a hedge-sparrow nest; the foreign egg was hatched and the hedge-sparrow reared the young blackbird!)

Jenner observed many hedge-sparrow nests containing a cuckoo's egg. His patience was rewarded. On one June day, to his "astonishment" he observed a newly hatched cuckoo fledgling, even as yet devoid of sight, in the very act of evicting its hedge-sparrow companion! The method utilized by the young cuckoo was most extraordinary. With the aid of its "rump and wings" the fledgling cuckoo managed to hoist the young hedge-sparrow upon its back, making there a "lodgement" for its burden "by elevating his elbows." Thereupon it moved backward with its victim, up the side and to the top of the nest; here, after "resting for a moment," the infant cuckoo, "with a jerk," tossed its victim clear out of the nest! Subsequently, it felt around for a bit with the tips of its wings, apparently to convince itself that the business had been properly dispatched; it then dropped back into the nest. When an egg was put into the nest, it was similarly eliminated! With its wing extremities the young cuckoo examines, as it were, an egg or nestling before beginning its murderous operations. Jenner remarks that the "nice sensibility" which the wing tips appear to possess seems to compensate sufficiently for its lack of sight at that early age. Jenner repeated these experiments a number of times in different nests and always found the young cuckoo possessed of the same murderous disposition.

If a bird too weighty for the young cuckoo to lift out was put into the nest, the cuckoo was "ever restless and uneasy." The inclination for so putting out its companions begins to lessen in the cuckoo from the age of two or three days to about twelve days, at which time (as far as Jenner could see) it disappears.

Not least amazing of all is the fact that, unlike other newly hatched birds, the cuckoo fledgling's back has a "considerable depression" in its middle. This depression provides a more "secure lodgement" for the victim hedge-sparrow egg or fledgling, when the cuckoo is in way of removing them from the nest. And, coinciding with the cessation of its murderous tendencies at the age of about twelve days, this cavity in the young cuckoo's back becomes "quite filled up"; its back then assumes the contours characteristic of nestling birds in general.

Jenner's paper, describing these remarkable events, was submitted to the Royal Society in London. But so extraordinary was the story that it was decreed by that learned body that the acceptance of the paper should be deferred to another year! The paper was accepted and read before the Society the following year. Even though there were attempts on the part of some to impugn his accuracy, Jenner's observations were subsequently fully confirmed by others.

## All-America Roses

Two hybrid tea roses—Forty-Niner and Tallyho—have been given the All-America Rose Selection crowns for 1949. Forty-Niner is said to be the most brilliantly hued bicolor rose ever introduced, with a rich yellow outside and a vivid red inside. Tallyho is also bicolored, with an unusual tint entirely new to roses, the color varying with the weather and the planting location.

## Geology Visual Aid

In conjunction with the publication of the third edition of *Physical Geology* by Chester R. Longwell, Adolph Knopf and Richard F. Flint, the publishers, John Wiley and Sons, have issued a new set of 250 custom-made color slides to assist geology instructors using the book in their courses. The slides are arranged to follow the chapter pattern of the book, and are the publishers' second venture in visual aid supplements to a textbook.

## Fooling Chiggers

Chigger-proof clothing that will stay that way for the life of the garment is a definite possibility as the result of U. S. Department of Agriculture research that has continued since the end of the war. Two organic compounds that can be used to impregnate cloth from which work and outing garments are made have kept the clothes lethal to chiggers after seven launderings. The research results have just been announced, but commercial application of the compounds has not yet been undertaken. Study of the problem came about during the war because the bite of an infected mite that is a close relative of the chigger was known to cause scrub typhus. Before the war was over protection was obtained by dipping the clothes of soldiers in five percent emulsion of dimethyl phthalate, assuring safety for a month. After the war, research went on from that point, with the resultant discovery of more effective and longer-lasting compounds. The most effective ones are phenyl carbonate and  $\alpha, \alpha'$ -dichlorodiphenyl ether.

## Freak Trees

Do you know of any freak trees—freak in formation or in place of growth? If so, Glen P. Burns, 1007 South 74th Street, Milwaukee, Wisconsin, would like to know about that tree, or trees. He is a collector of such information, both descriptively and, particularly, pictorially. He is planning to issue a booklet as a by-product of his hobby and solicits co-operation far and wide. If you have a picture of a freak tree he would like to see it, with accompanying data. If you want the picture back he will copy it and return the original. And to all who aid him in adding to his collection he will send a copy of the booklet.



# Contents Noted

**P**ROBABLY because of over-reliance on the opinions of the experts, the result of the Presidential election was as much of a surprise to us as to almost everyone else. Being under no compulsion to do any political soothsaying, we were spared the mortification of having to dine on crow because of any prediction that we had committed to cold and inexorable type. Which moves us to wonder why one must figuratively dine on crow in expiation of a bad guess. Possibly the expression derives from the long-accepted phrase of having a "crow to pick" with someone in settling an embarrassing matter. Crow banquets have been held, of course, in connection with the ballyhoo about shooting off the crows, and a young crow is said to provide rather satisfactory table fare. However, all these expressions seem to be related to the general opprobrium in which the big black bird is held, in large measure without justification. In any event, the phrase acquired great currency on the third of November.

**P**OLITICAL analysts, looking backward upon the wreck of their predictions, seem to agree that one weakness of Mr. Dewey's campaign was the consistent equivocation of his speeches. So far as conservation was concerned we looked and listened in vain for any reassuring statement, garnering only a crop of lovely but empty platitudes. It was impossible to decide just where the aspirant actually stood on any of the basic issues of the use and abuse of our natural resources. Perhaps Mr. Dewey and his advisers did not feel that conservation was important, and if this was the case they were just as wrong there as they appear to have been otherwise.

**H**OWEVER disappointed—or elated—some conservation-minded people may have been at the outcome of the election, pleasure will be derived from the absence of some faces in the make-up of the new Congress. Senator Robertson of Wyoming, for example, will be among the missing, together with other enemies of a sound public land policy. We confess to regret that Congressman Barrett was not also a victim of the Democratic sweep in Wyoming, but perhaps he has been a little startled, nevertheless, perhaps even abashed. And he may find some of his tactics of the past two years less popular with his colleagues of the new Congress.

**A** RECENT issue of *This Week Magazine*, syndicated Sunday magazine, carries a picture of five school children admiring a stuffed robin on a nest. Before the youngsters is a large box of birds' eggs. The cap-

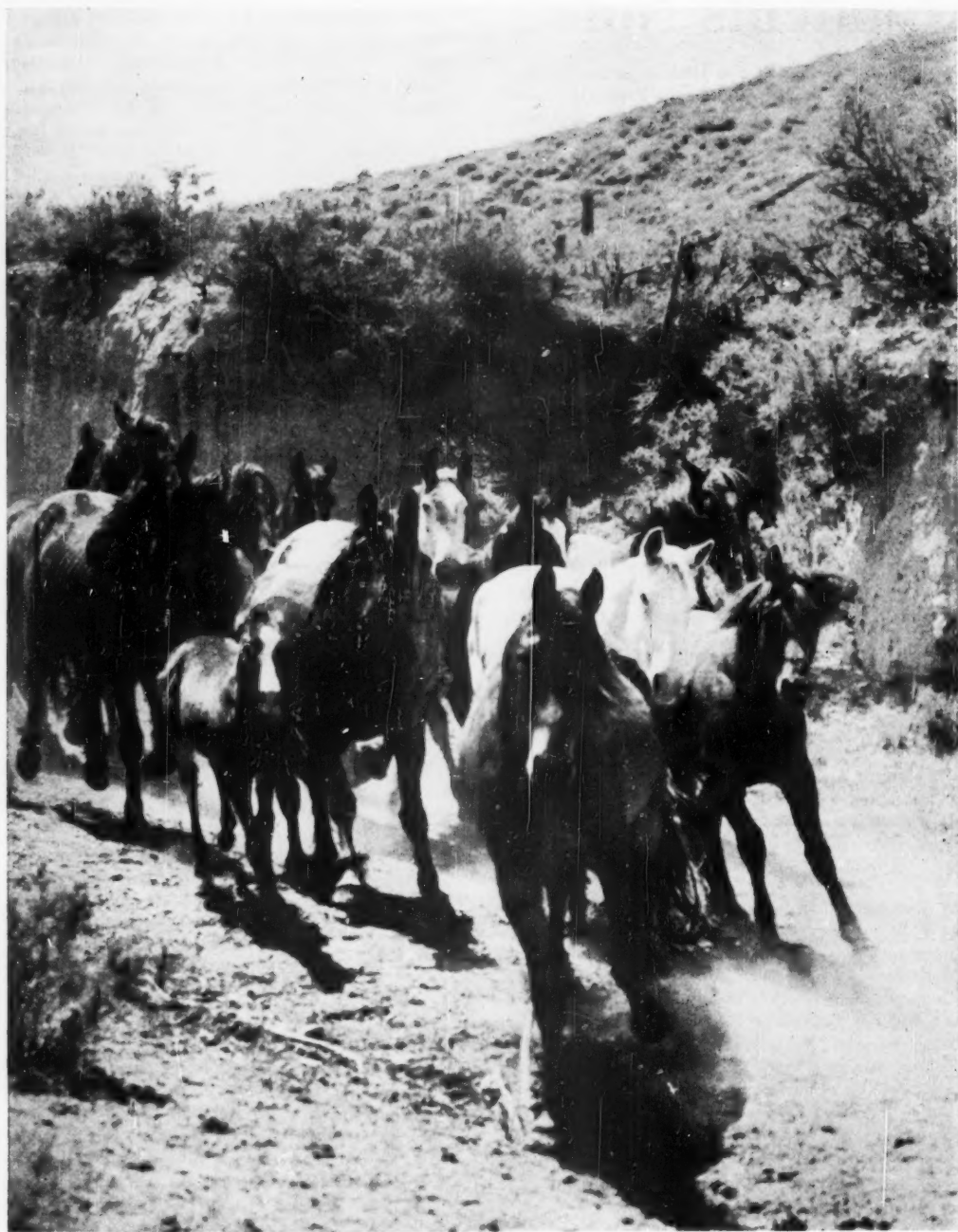
tion reads: "In Georgia school, fourth graders learn about birds by 'doing'. . . . The children gathered birds, nests and eggs from around the countryside. Dissected bird nests to learn material used in building. These Georgia youngsters can identify different birds, their eggs and their nests." The locale of this "astounding" development in Nature study appears to have been Marietta, Georgia, where a little intensive teacher education would appear to be sorely needed. Publication of such a picture is discouraging in the light of progress made in wild bird protection. The picture appears in juxtaposition to, and seems to be an integral part of, an advertisement for Betty Crocker split pea soup, but we trust that the apparent relationship was the editor's, and not the advertiser's, idea, however in error the former may have been.

**W**HEN the duck shooting season in Wisconsin was due to open on October 30 a dangerous dry condition existed in Wisconsin forests. Wisely the State Conservation Commission closed the hunting season, and the duck hunters were deprived of five days' shooting, until rains reduced the hazard. Whereupon an emergency extension of five days was added to the gunning season in northern and central Wisconsin by the U. S. Fish and Wildlife Service. This solicitude of the Service for the gunner is both touching and revealing. Unfortunately the birds seem to enjoy little of such official solicitude in proportion to that afforded the harvesters.

**E**VERY conservationist, particularly those in New York State, should be aroused by the issue presented by the Panther Dam project in the Adirondacks. This is a fundamental invasion of public rights of a sort that makes it more important than the mere effects of the dam itself. The Adirondack Moose River Committee, with headquarters at Fort Plain, New York, is leading the fight with the support of many national groups. The Committee will be happy to send a statement of the situation.

**F**ACED with the pressures of constantly rising costs of printing, engraving, paper, and just about everything else connected with the publication of a magazine, *Fauna*, magazine of the Philadelphia Zoological Society, has been forced to suspend publication. We are sorry to see this estimable contemporary depart, but we know full well the problems that it encountered, for we have them, too. Were it not for endowment support we, also, could not carry on in the face of production costs that have more than doubled in a few brief years. It is a dangerous trend that forces the suspension of any constructive endeavor.

R. W. W.



Ears up, this group of wild horses, frightened by the roar of a low-flying plane overhead, are being driven toward the trap in a streamlined wild horse round-up. Hidden behind a sage bush, Verne Wood, Rawlins, Wyoming, photographer, caught this action picture.



© VERNE WOOD

"Desert Dust" is the name of this wild Palomino stallion. Wide sale of the splendid picture has aided Verne Wood's campaign for a wild horse refuge.

## A Kingdom for Wild Horses

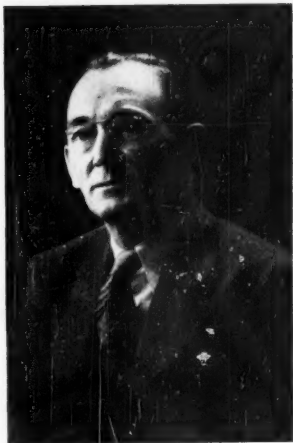
By BARNEY SCHWARTZ

Photographs by Verne Wood

**O**UT in Wyoming, there is a one-man campaign being waged to save the wild horse from the fate of the buffalo. It is a campaign met with moral support from some, indifference from others, and out-and-out threats from the opposition.

Threats of being "run clear out of the state" have not stopped Verne Wood, a photographer, of Rawlins from promoting his ambitious plan for a state-controlled refuge to insure preservation of this member of Wyoming's—and the nation's—wild-life family.

Through his wild horse pictures, Wood has publicized Wyoming in every state of the nation, and in foreign countries. Photographing the horses, however, is more than a business with him. It has a humane aspect, for every cent earned from the pictures is used in furthering the



Verne Wood, Rawlins, Wyoming, photographer, who is waging a campaign for a refuge for wild horses.

campaign for a wild horse preserve.

Verne Wood has traveled thousands of miles to present his plan. He has talked with ranchers, townspeople, state and national officials, game commissions, and just plain horse-lovers like himself.

He proposes that some rugged area of Wyoming's vast expanse of land be set aside for the refuge, which would be supervised and controlled by fish and game wardens. In such an area of natural habitat some four hundred head would be permitted to live without danger of being rounded up by professional horse-hunters, who have streamlined their methods to capture great numbers in mass round-ups.

Three years ago these professionals began using airplanes equipped with screaming sirens, which send their prey into wild frustration. This is a



**Wild horse country. In such inhospitable terrain the animals live—and fatten. All Verne Wood asks is that the horses be given such a region in which to live in safety.**

far cry from the true western wrangler who rode horseback to catch a wild horse, and never left one harmed.

Wood, who has recorded the streamlined round-ups by way of his camera shutters, sounds a warning because he has seen horses left to die on the plains. "I've seen frothing, heaving colts and mares chased so long and so relentlessly that their swollen joints couldn't support them, and they dropped in their tracks to become food for vultures and other scavengers," Wood says.

Those that do survive, he points out, are sold to fox ranches and other outlets, which pay two cents per pound, and up, for horse flesh on the hoof. Some of the captured wild horses weigh as much as 1250 pounds. Others are smaller, averaging between 750 and 850 pounds.

Another brutal practice is "nostril hobbling." This sometimes is performed at the end of a chase. The horses' nostrils are slit with a

**A trap for the horses. Panic-stricken animals are driven into this spot to await shipment. Railroad ties provide the fence, over which some of the fear-crazed horses jump.**

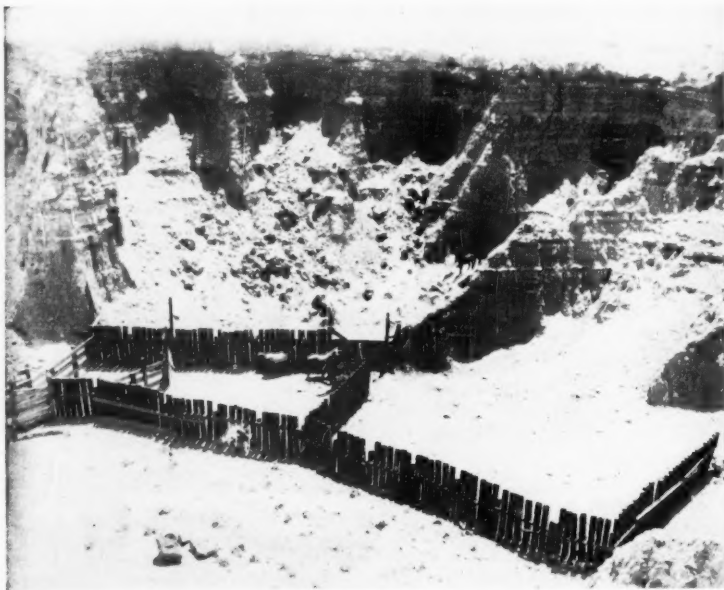
pocket knife, and baling wire is run through the slits and twisted to close partly the nostrils so the horses cannot breathe sufficiently to run away. Of all the unnecessarily cruel practices, this is the most vehemently condemned by the Wyoming Fish and Game Department.

"At times," Wood said, "the nostrils fester and slough away so badly that the baling wire drops out even before the horses are ready for shipment to a butchery."

From the viewpoint of Wyoming itself, Wood main-

tains, this refuge would become a great tourist attraction. As it is today, the only "raring" horse a tourist sees is the buckin' bronco on the State's license plates. Ordinarily, travelers must be content at marvelling at the precision of the table-top rock formations, at the countless miles of sagebrush, at the sight of an occasional cowboy and a chuck wagon, and at the exhilaration of crossing the Continental Divide.

"Every day during the vacation months, tourists







Heading for the trap. Several bands of wild horses, started from their haunts in Wyoming's most rugged hills, provide a picture of wild frustration as the airplane and siren above them forces the panic-stricken pace. Later, many of them will become food for dogs, or for the foxes on fur farms.

ask us where they can see wild horses," Verne Wood declares. This is particularly true in Rawlins, on Route 30, where pictures of wild horses enrich many restaurant menus for the tourist trade.

"You'll find the horses up in the hills," is one of the answers. It is as good an answer as any. The wild horses are in their last isolated haunts, "up in the hills" of Wyoming's most rugged land, where only those born to such surroundings can survive.

In the Delaney Rim country in the Red Desert, west of Rawlins, thrives a light breed of fleet saddle stock of varied colors. A breed of smaller blue roans, of seemingly unlimited stamina and endurance, predominates in the Chain Lakes area. Hot-blooded saddle stock roams in the high plateaus and canyons of the Haystack Mountains. Blacks, bays, and some grays match their ruggedness with that of Crooks Mountain, while heavier draft breeds make their home in the Little Colorado Desert.

The wild horses stay within their own chosen domains, braving the elements of this arid State, pit-

ting their strength against other wildlife, and against strong wind currents and sudden blizzards, which use Wyoming as a playground.

Perhaps a visitor is interested in the State's rich equine history. He is determined to see at least one majestic stallion leading a band of mares and colts. If he is lucky and has the time, he might find someone willing to take him far into the off-road places.

It is not a trip for the tenderfoot to try alone. Unmarked trails may appear dangerous. There are mountain lions, bull moose, and outlaw bears, both blacks and grizzlies. They are sights to see, too, but some of them are too dangerous for the uninitiated. The greatest danger, however, is that of getting lost in the endless miles of sagebrush, rocks, gullies, mountain passes, and more sagebrush.

Wood's over-all plan includes well-marked byways leading to the refuge, byways on which parties could travel by automobile, wagon or on horseback most of the way, with an almost sure chance of seeing wild horse bands at the end of such a most rugged trip.

However, there are others who seek out the horses for other than the thrill of seeing them. These are the round-up men. A typical round-up in which an airplane is employed is one at Delaney Rim, about 20 miles off Route 30, south of the small town of Wamsutter.

Two days before the mechanized chase, hired men go to the camp located high in the mountainous sector. This particular camp site is not far from the rock formation known as "The Old Man and the Boy," so called because one high rock resembles a hunter and another rock, half as large, looks like a boy following him.

Near the camp is an area stripped of its sagebrush and cleared of rocks to serve as a landing strip for the small plane. Close-by is a natural corral formed by high cliffs. The only entrance to it is an opening about 100 feet across. At the corral is a trap made of railroad ties pounded into the ground like fence posts and connected firmly by steel cable and four by four timber.

"Horses, finding they are trapped in there, have become so frantic they've jumped over this high barrier in an effort to escape," Wood points out.

There is irony in this particular trap, Wood adds. "It was prepared by real wranglers like Jim and Jessie Karstoft, Bill Byers and Jack Tapers, who chased wild horses with horses, caught them with a rope, and didn't harm any of them."

Those waiting at the trap get their first indication that the chase is getting near when they hear the screaming siren and the drone of the motor of the plane, which is able to cover more distance and to scare out more horses in two hours than other methods can in a day or more. The plane dives, zooms and buzzes its motor in duet with the siren, keeping the frustrated animals on the forced pace and headed for the trap. Horse-hunters know these horses can run to a limit of 25 miles, and even then show a sudden spurt of speed in an escape attempt!

Suddenly, the onlooker sees the band break over a ridge, and, in just a few minutes, he gets an unforgettable scene of the frenzied animals, who whinny, scream, and come as close to roaring as horses can, as the menacing plane and its siren dive again and again like a mad hornet, forever plaguing.

The horses' sides are heaving violently. The dust churned up by their speedy hoofs is sucked in as they gnash their teeth and roll their once-defiant eyes.



"Timberline," a wild colt captured by Verne Wood and given his own little refuge, is not in the mood to pose for the camera, exhibiting only a disdainful hindside.

The stallion is as bewildered as his followers. For once in his alert life he is helpless before such mechanized tactics.

"It's at a time like this," Wood reflected, "that any person with even the slightest regard for animal life feels an overwhelming shame. You want to jump up and shout 'for God's sake, call a halt to this!' But your own hopeless words would be drowned out by the siren, the whinnying and the hoofbeats."

As they are forced into the trap, the horses are like humans trapped in a locked safe, frantic, irrevocably lost. One pilot, on seeing and hearing of the results of his flying, refused to fly another such mission.

If hobbling is practiced, it is now that men go to work with the baling wire. If not, the horses are secured within the trap, to wait until trucks haul them to railroad stations. Some of them might escape butchery by being sold for rodeo purposes. In rare cases, some are sold for export.

It was such a mechanized round-up that prompted Wood's plan. Those opposing the refuge argue that the horses in it would overrun the range to the detriment of domestic stock. Soon after the plan became known, a man entered Wood's modest studio and flatly warned: "We'll run you clear out of the State if you don't stop!"

Wood's rebuttal to that was: "Wild horses live only in the most rugged country and fatten under conditions that would kill domestic horses. Domestic stock is never found anywhere near wild horse habitats. The wild ones sometimes must go 30 miles for water at holes domestic breeds couldn't reach!" Further, he promised: "If anybody can show me how 400 wild horses in that type of refuge could overrun the range, I will stop!"

Nobody has shown him.

Aware of necessary control to keep the number from exceeding 400, Wood maintains there are several humane methods, one of which could be round-ups at scheduled times. These would be round-ups inside the refuge, with horses caught by men, or women, on horseback. The number to be captured would be pre-determined by wildlife officials.

"Such round-ups could be promoted to national importance and could benefit Wyoming," Verne avers. "Thousands, both spectators and participants, would be attracted to this sporting event."

Greatest financial aid in (Continued on page 50)

# The Good Earth Strikes Back

By ERNST BEHRENDT

Illustrated by Garnet Jex

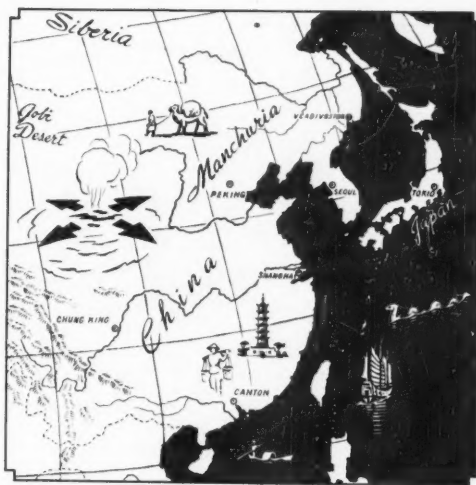
ON December 16, 1920, a huge tidal wave swept over the island of Yap, capsizing a hundred native vessels and drowning cattle and pigs. On the same day, 150 persons were killed in Argentina when an earthquake destroyed several villages in Mendoza province. Again on the same day, an earthquake wiped out the town of Tepelini in Albania. The tidal wave and the earthquakes received a paragraph or two in the newspapers; yet on that same eventful day Kansu province in China was hit by still another earthquake, and this one the newspapers missed, although it developed into one of the largest catastrophes in history.

The Kansu earthquake lasted over a dozen years. It was marked by periods of quiet interrupted by three exceedingly violent convulsions of the earth. The first of the three quakes alone—the tremor of December 16, 1920—probably took a larger toll of human lives than any other single catastrophe in modern times. It even dwarfed the Tokyo earthquake of 1923, in which 99,000 people were killed. In Kansu, 180,000 died within a few minutes; but this figure is based on the most conservative estimates. Chinese statistics speak of one million—one million who perished in the first quake, not in the three quakes together!

The powerful tremors alone would have been sufficient to cause damage on an unprecedented scale. When the seismograph of the Imperial University in Tokyo registered what was said to be the greatest earthquake ever recorded—so great that the shock broke the needle of the instrument—the convulsions of the earth in



Landslides closed the cave where Ma Shan-ren plotted with his men.



The region of Kansu, where the "forgotten earthquakes" spread disaster.

China were felt over an area the size of the United States. But what made the Kansu earthquake one of the worst disasters of its kind was not the violence of the tremors but an unholy alliance of destructive forces. Fire and water, heat and cold, earth and air seemed to conspire to wipe one of China's most fertile regions from the map.

Nature could hardly have done a more competent job of annihilation if the plot had been engineered by a writer of horror stories. Everything seemed arranged according to some fiendish plan. Its details were kept secret as if on purpose. There were no warning signs, no fore-shocks, not even the usual rats scurrying from their holes in terror. When, on that fateful December evening, people went home after the day's work, they were completely unaware of impending doom.

Afterward, it seemed as if some supernatural power had carefully herded them into their homes to let no one escape. It was one of the coldest nights of the year. People who ventured outdoors were promptly driven back by icy gales from the Gobi Desert, from which sand and dust blew into their faces. The streets and roads of central Kansu lay deserted.

Suddenly, at eight in the evening, there was a deep rumbling noise, followed immediately by an ear-splitting crash. In dozens of towns and cities all over central Kansu the ground danced like a storm-tossed sea. Trees snapped, bridges broke, houses were shattered, shoved into one another, or jerked upward as if released from giant springs. Seconds later, a deadly rain of rafters and masonry descended upon the people. Many thousands were killed at once. Others might have survived if the night had not been so cold that all the stoves were lit, as were the lamps, and, when the buildings collapsed, stoves and lamps,



**"A farmstead with barn and orchard was tossed bodily across the entire width of the 'Valley of the Dead,' careening wildly as if guided by a drunken driver. . . ."**

ignited the debris. Trapped, the victims were burned to death.

Yet, again, many survived, and rushed outdoors to flee from the flames. But often there was no outdoors. The very first shock had cracked the crust of the earth. Gaping chasms yawned where streets had been. Blinded by the dust storm, driver, frantic by the heat, people rushed into abysses. New tremors shook the earth. New abysses sprang open as others closed over the men and women attempting to scale them from the inside. Some did manage to escape. They crossed the fissures over bridges formed by human bodies and stumbled on, trying to find their way among burning houses and geysers of black water, which suddenly spouted from the ground.

But more often than not people had no chance of escape whatsoever. Areas as large as entire city blocks disappeared as the earth swallowed the houses whole. In the town of Tsingningchow, a narrow chasm hundreds of feet long opened directly under the main street. The houses on both sides were tilted toward the center until their gables touched; everything in them was poured into the gap, stoves, beds, people, and all. Roads were cut as with a knife. Whole sections of streets and highways simply vanished and only an occasional cartwheel, suspended on the rim, told the story of the carriage, the team, and the driver who now lay many yards below.

Fire and chasms are rather common by-products of earthquakes; the Good Earth is not. And in Kansu it was the Good Earth itself, the best soil in all of China, which wiped out what was left of the towns and cities and destroyed the countryside, which otherwise might have been spared.

The Good Earth of Kansu is rich, heavy, fertile loess. Loess, part powdered quartz, part clay and other substances, has been deposited in the valleys by winds carrying it from the Gobi Desert. It covers not only

the valleys but the slopes and summits of the mountains as well. On the rocks of the Liu Pan Shan chain in central Kansu, the epicenter of the great tremors, it reaches a depth of several feet.

But loess only covers the mountains; it does not cling to them. It rests on the rocky slopes as a blanket rests on a sleeping man. When the man tosses, the blanket slips to the ground. When the mountains tremble, loess blankets weighing millions of tons are sent crashing down into the valleys.

And that is what happened in Kansu. The shocks were so severe that square miles upon square miles of loess were suddenly torn from their foundations. Enormous slides thundered down the slopes and through the passes, gathering momentum as they approached the valley bottom. On their downward path they poured streams of sticky earth into the openings of innumerable caves that dotted the slopes. Most of these caves were inhabited.

Farmers lived in them, near their terraced fields, closing the entrances by night, and taking shelter with their families, and, in the large caves, even with their herds.

Almost the entire cave population of Kansu was wiped out. Days later, searching parties still heard muffled cries coming from deep down in the mountains. Sometimes they heard the barking of dogs and the bleating of sheep shut up with their masters in the sealed caves. The rescuers did dig out a few people alive; but in most cases not even the place could be found where the cave had once been.

**"One piece of highway could be identified only by the heads of sixteen camels sticking out of the ground; the rest of the caravan was buried."**





In one of the larger caves near the city of Sakhu five hundred conspirators were gathered to listen to the words of Ma Shan-ren, "Holy Ma," fanatical leader of Kansu's Mohammedans and of the Independence Movement, which was attempting to split the province from the rest of China. Ma Shan-ren was giving his officers last minute instructions. In a few days they were to raise the green banner of the prophet over every *hamen* in Kansu. Outside the cave heavily armed guards let no one approach the entrance. Suddenly the earth heaved and groaned—an auspicious sign from heaven. "Allah be praised," the guards exclaimed. A rock came hurtling down. And then the avalanche was upon them. One of the guards escaped, but Ma Shan-ren was entombed with his five hundred followers. None of the bodies was ever found. And the course of China's history had been changed.

Everywhere the landslides seemed to single out Mohammedan towns and villages for destruction. Two colossal slides buried the Mohammedan city of Sakhu and its 10,000 inhabitants. Many other settlements were completely submerged by an ocean of loess—it did look curiously like a frozen ocean with waves and vortices and combers. Most of the familiar landmarks were gone. Valleys became almost flush with the surrounding hills; distant peaks, formerly hidden by intervening ridges, appeared. A famous pagoda on a hill near Pingliang came tobogganing down into the valley bottom, its walls intact, its bronze bell still tinkling, until it was crushed by a new avalanche. A farmstead with barn and orchard was tossed bodily across the entire width of the "Valley of the Dead," careening madly as if guided by a drunken driver, caught in wild cross-currents, whirled around and finally deposited on top of what had been a village. Whole sections of highways went on mad rides and came to rest—the trees that flanked them still standing—thousands of feet away amidst a rock-strewn no-man's-land. One piece of highway could only be identified by the heads of sixteen camels sticking out of the ground; the rest of the caravan was buried.

All night the earth writhed and the landslides kept cascading down through the passes of Kansu. That night, the town of Kingchow was razed, Hweining was burned to the ground, and scores of other towns were shattered or buried. Forty thousand were killed in Kuyuan, 70,000 in Haicheng. In many districts the dead outnumbered the living. But the disaster had not yet spent its force; its aftermath was almost as frightful as tremors, fire, and landslides.

While the survivors were still struggling among



"... what made the Kansu earthquake one of the worst disasters of its kind was not the violence of the tremors but an unholy alliance of destructive forces."

the ruins, digging for friends and relatives, while after-shocks were collapsing what had been left standing and it seemed as if the earth would never become quiet again, people became aware of a new deadly peril—water. Everywhere the slides had blocked the waterways. They had dammed up the creeks and streams and transformed them into lakes. After a few days the soft, earthen barriers were beginning to give way. Sometimes they burst. When they did, torrents of mud flooded the valley bottoms and more people died.

And people died of cold and exposure. They died of typhoid, which suddenly swept the province. And they died of hunger. Famine gripped Kansu. Most flour mills lay shattered; grain was buried in sunken villages and sealed caves.

Then the last and most incredible chapter of the earthquake began. It can only be described as a world-wide conspiracy of silence. Days passed, weeks, months, and no help came from the outside. At first the frantic calls for food, clothing and medicines hardly penetrated beyond the borders because the telegraph offices were destroyed and travel had come to a standstill. Then news of the catastrophe leaked out, but for weeks afterward no reliable information about the Kansu earthquake was received any-

where. The metropolitan centers of China remained strangely indifferent. In January, 1921, the *North China Herald*, published in Shanghai, wrote vaguely about the earthquake in the North as if it were a minor incident, adding hopefully: "The Chinese say such occurrences betoken good harvests."

Other documents, written at about the same time, speak an entirely different language. They can be found in the diaries of a handful of missionaries who pitted their heroic efforts against the misery of millions, and they tell of utter chaos, of missions overflowing with refugees and orphans, of countless suicides, and of parents who killed their children because there was nothing to eat. To make matters worse—and they could still be made much worse—what little food was sent to Kansu did not reach its destination because it had to pass through the neighboring province of Shensi, and Shensi, as the newspapers put it, "was in a disturbed state."

The Chinese in the South seemed to care little, and other countries cared even less. When, many weeks later, details became known abroad they had already lost their news value. The disaster in Kansu was shrugged off as one of those mass tragedies that are common in China, where everything happens on a

larger scale. Even the *World Almanac*, faithful recorder of everything worth knowing, ignored the Kansu earthquake of 1920 until 1946. A few magazines did describe what was called "the forgotten earthquake," but the world was not interested. Kansu was a far-away province of a far-away country. It had become too late to do anything about it anyway. There had been an earthquake, but that was almost ancient history now. It would not happen again. But it did happen again. And again. Twice, in May, 1927, and in December, 1932, violent earthquakes shook Kansu. It was the story of 1920 all over again—tremors, chasms, fire, landslides, floods, epidemics, famine. In 1927, the city of Tumentse disappeared beneath a moving mountain of loess, Sisiang was razed, and Kulang, and Liangchowfu, in which 80,000 people had lived. In 1932, the dead numbered 70,000 in the district of Kaotai. And again, as in 1920, there was that amazing world-wide conspiracy of silence and apathy. The news was forgotten as soon as it trickled out. The disasters left no trace in the minds of men. Yet on their Good Earth, and under it, the people of Kansu had lived—and died. It was as if the earthquakes had happened on another distant and silent planet.



## "And Bright Stars"

By MABEL IRENE HUGGINS

THE following starry lines may be found in some of our well-known songs and in the writings of world-famous poets. Match each quotation with its writer from the list below. Answers on page 50.

- |  |  |
|--|--|
| a. ( ) "The silent stars go by."   | n. ( ) "'Tis sweet to see the evening star appear."  |
| b. ( ) "... all I ask is a tall ship and a star to steer her by."  | o. ( ) "How often at night, when the heavens are bright<br>With the lights from the glittering stars..." |
| c. ( ) "And set the stars of glory there."   | p. ( ) "Whilst all the stars that round her burn,<br>And all the planets in their turn..."               |
| d. ( ) "Slender and clear were his crystal spars<br>As the lashes of light that trim the stars."                                     | q. ( ) "The night has a thousand eyes and the day<br>but one."   |
| e. ( ) "... by punctual eve the stars were lit."   | r. ( ) "Oh, thou sublime, sweet evening star,<br>Joyful I greet thee from afar."                         |
| f. ( ) "The star-bespangled heavenly scroll."  | s. ( ) "Twinkle, twinkle, little star..."  |
| g. ( ) "The good mate said: 'Now must we pray,<br>For lo! the very stars are gone.'"   | t. ( ) "Whose broad stripes and bright stars..."   |
| h. ( ) "My star that dartles the red and the blue!"  |  |
| i. ( ) "Silently one by one, in the infinite meadows<br>of heaven,<br>Blossomed the lovely stars, the forget-me-nots of the angels." |  |
| j. ( ) "Alas for him who never sees<br>The stars shine through his cypress-trees!"   |  |
| k. ( ) "Look how the floor of heaven<br>Is thick inlaid with patines of bright gold."  |  |
| l. ( ) "Sunset and evening star<br>And one clear call for me!"   |  |
| m. ( ) "The stars are golden fruit upon a tree<br>All out of reach."   |  |

### WRITERS:

- |                |              |                |
|----------------|--------------|----------------|
| 1. Browning    | 8. Whittier  | 15. Taylor     |
| 2. Higley      | 9. Stevenson | 16. Byron      |
| 3. Addison     | 10. Drake    | 17. Longfellow |
| 4. Wagner      | 11. Eliot    | 18. Miller     |
| 5. Tennyson    | 12. Brooks   | 19. Masfield   |
| 6. Bourdillon  | 13. Willard  | 20. Lowell     |
| 7. Shakespeare | 14. Key      |                |

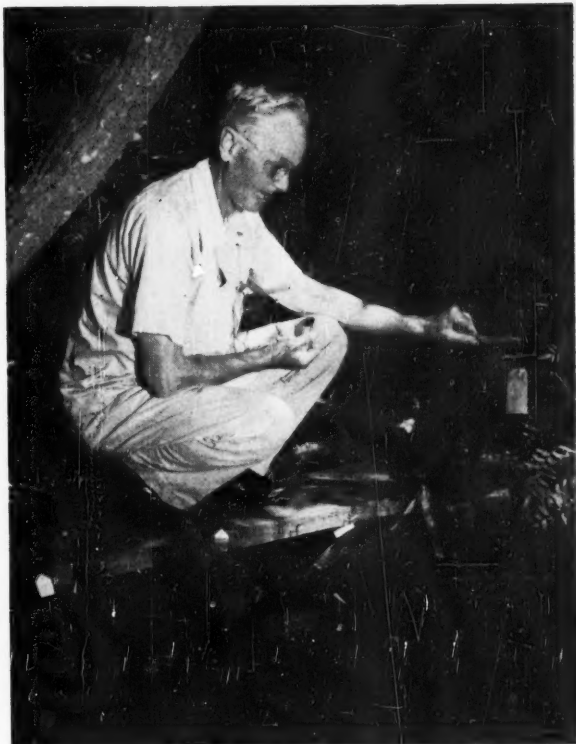
# Dragonfly Man

By LORUS J. and MARGERY J. MILNE

**H**E HAD just celebrated his eightieth birthday when we met him unexpectedly at a Florida research laboratory. The whole staff of the Archbold Biological Station was proud to have him there, happy to see his continued delight with new discoveries. This enthusiasm is what makes Dr. James G. Needham such a keen observer, so pleasant a conversationalist, and such a good scientist. Every morning he was up before we were, at work on his insects. The bugs were calling him.

After his long association with Cornell University—as graduate student, faculty member, and chairman of the Department of Limnology and Entomology—it is difficult to think of Dr. Needham as not having originated in Ithaca. Yet he spent the first third of his life in Illinois, having been born in that State, and took his training as far as a master's degree at Knox College. His interest in the whole field of living creatures developed there under Professor Albert Hurd, a scientist who had come under the stimulating influence of the great Louis Agassiz. No doubt much of his early enthusiasm was lavished on the students of Jerseyville, Illinois, High School, where Mr. Needham taught science for two years. This was a busy time in which he completed the work for his advanced degree at Knox, saw the publication of his first book (1893, *Elementary Lessons in Zoology*), courted and won Anna B. Taylor as a helpmate, and decided on a year of postgraduate study at The Johns Hopkins University. The following year, at this institution, under the direction of Dr. William K. Brooks, Mr. Needham had his "first experience in a biological laboratory." In those days such facilities were rare, and correspondingly appreciated. With what mixed emotions, then, came the offer of an instructorship at his alma mater, starting with a summer session teaching natural history, and a future of general biology. He accepted—knowing that the sole equipment was two poor microscopes—only to have the general biology course postponed. He was given five classes in plane geometry instead!

The promised course materialized the following year (1895-96). So did 165 students clamoring for training in the new subject. "Without microscopes,



Dr. J. G. Needham, world authority on dragonflies, examines an immature specimen from one of his rearing cages. Additional cages, each with its identifying label, rest against the plank on which he crouches. This pond is a part of a drainage ditch near the laboratory of the Archbold Biological Station.

protoplasm, cell constituents, cell division, mitosis, and all the basic phenomena that underlie plant and animal alike, and whose discovery brought about the recognition of the science of biology, could not be seen. And demonstration of them to 165 pupils one at a time was utterly impracticable," Dr. Needham observes. Yet that course, based, as he was forced to make it, on materials that chanced to be available locally, provided both the young instructor and his students with valuable experience. That Mr. Needham had to collect his specimens himself, in time for each class, gave his discussion of them a freshness that can be gained in no other way. It was this and similar field experience that led him to draw together his second book, *Outdoor Studies*, which appeared at the close of his graduate work in 1898.

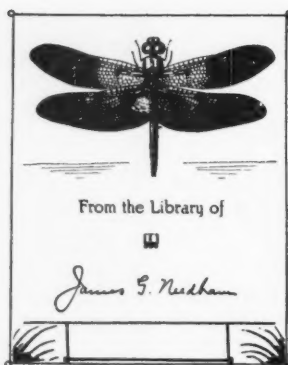
With such a background, James George Needham came to Cornell on a scholarship, to add further to his knowledge of a favorite group of animals—the insects. In Ithaca, with the gifted John Henry Comstock, he came into the direct line of descent in American entomological tradition—for Comstock was himself the first student of Hermann August Hagen, the famous

Viennese specialist whom Louis Agassiz had brought to Harvard as the first professor of entomology in the New World. And although Comstock was at this time deep in research work on wing venation—the subject matter of a 1918 book that was perhaps the greatest contribution to knowledge of entomology in half a century—he found time for frequent field trips with his graduate student. The nineteen years difference in age between the two men did not diminish their mutual pleasure in observing insects alive and in their native haunts.

The research work that won his doctorate degree in 1898 was only the beginning of a half-century of investigation of dragonflies—a study that Dr. Needham is actively continuing at present. Even in the early days, he did not restrict his attention to the specimens in the Cornell collection, since Professor Comstock arranged for him to continue his work for a while *in absentia*, at the Harvard Museum of Comparative Zoölogy, where the great wealth of material drawn together by Dr. Hagen was available to him. Many have been the return visits for comparison with specimens there from all over the world.

For nine years following the completion of his

Dr. Needham holds one of the largest of the dragonflies in the vicinity of the Archbold Station. The insect is placed so that its feet just touch a small branch and in this position will take other insects, such as small grasshoppers, when offered with a pair of forceps. Above, the appropriate bookplate of Dr. Needham's library.



far-reaching research work there each summer. For years, the summarizing *Aquatic Insects of the Adirondacks* (1909) was a standard reference piece for students in limnology; more recently it has become a classic. But out of this expansion of a new field came an invitation from Cornell University to return to Ithaca, to become a faculty member as Assistant Professor of Limnology. He accepted, and after four years was promoted to Professor of Limnology and Entomology. On Professor Comstock's retirement in 1914, Dr. Needham succeeded him as head of the department, a post he filled with distinction until his own emancipation from academic duties in 1936.

During these years at Ithaca, there came from Dr. Needham's facile pen a series of reference works for which he is world-famous. With the assistance of another Cornell faculty member, J. T. Lloyd, arose the standard work on limnology, *The Life of Inland Waters* (1915). His own son, Paul R. Needham, collaborated with him on a highly useful pictured key *A Guide to the Study of Fresh Water Biology* (1928), which has gone through edition after edition because of popular acclaim. More specialized were *A Monograph of the Plecoptera of North America* (1926) with P. W. Claassen, *Leaf-mining Insects* (1928) with Frost and Tothill, and *A Handbook of the Dragonflies of North America* (1929) with H. B. Heywood. The last of these serves as a milestone in the study of Odonata—but it is a marker that Dr. Needham now has passed a long way. Nor did preparing these books restrict his mind from the broader aspects of biology. The titles of some others indicate the scope of his interests: *Natural History of the Farm* (1913), *Elementary Lessons on Insects* (1928), *The Animal World* (1931) and *A Survey Course in General Biology* (1932). These were in addition to sound research papers totalling toward the two hundred mark as 1936 approached! Dr. Needham has always been a busy man!!

One change—but no rest—from this schedule was a year in China under the auspices of the China Foundation for Promotion of Education and Culture. Dr. Needham spent 1927 (Continued on page 52)





# Curious Dragonroot

By EDWIN F. STEFFEK

**T**HE curious dragonroot is first cousin to the Jack-in-the-pulpit. It goes by the technical name of *Arisaema dracontium*. Found over a large part of the United States—from Maine to Texas—it has never been common. Now it is even less so.

It is a curious plant with large, divided leaves, often with seven but occasionally as many as seventeen parts. It grows to a height of two to three feet. The spathe is small and green, while the spadix, unlike that of the Jack-in-the-pulpit, projects far above it in a sort of dragon's tail. Its fruit is a cluster of orangish to reddish berries. Generally, its blooming season follows that of its cousin.

Although dragonroot is rare, it is easy to grow. It prefers a soil a little more dry than its cousin, but is not fussy. While it will grow in soils more or less on the neutral side it will also survive in acid ones, along with clethra, bunchberry, and wintergreen.

Like the Jack-in-the-pulpit, this plant may be grown from seeds squeezed out of the pulp and sown in the fall before they dry out. Plant them three-fourths-inch deep in moist, partly shaded ground, or in flats. Some should appear the following spring, but not all. Blooming should commence the third year.



## Can a Squirrel Be Hurt by a Fall?

**T**HOSE who have had the pleasure of seeing flying-squirrels scale from tree to tree, or tree to ground, know that they can land as lightly as the proverbial feather. But they have gliding membranes, unique in their tribe.

Yet squirrels in general, as lifelong tree-huggers, are able to flatten more than most mammals and have long tails margined with copious brushes of hair that must have considerable supporting power in the air. That a member of the family, as large as or possibly larger than our fox squirrel, is an accomplished parachutist is revealed by a narrative in the "Summerland Sketches" of Felix L. Oswald, 1880. He relates that some boys in Pueblo, Mexico, seeing the large black squirrel they were chasing jump from a housetop without injury, thought it must have the powers of a witch. At last they captured it and were planning to test its witchcraft further by throwing it over a 600-foot precipice. The observer persuaded them to let the squirrel, "as bulky and heavy as a moderate tomcat," risk the jump on its own account, if it would. Released on the brink and surrounded in other directions by the experimenters, the squirrel "looked down and then back and sideways, as if comparing the

chances of escape in the different directions, and finally clambered to the edge and turned half around, so as to face an open space between the spectators and the brink of the precipice. But just when we widened our circle to intercept a flank movement he took a flying leap into space, and fluttered rather than fell into the abyss below. His legs began to work like those of a swimming poodle-dog, but quicker and quicker, while his tail, slightly elevated, spread out like a feather-fan. A rabbit of the same weight would have made the trip in about twelve seconds: the squirrel protracted it for more than half a minute. With utter disregard of the conventional laws of gravity the ratio of its descent decreased, till it appeared to hover in empty space, and alighted as easy as a skylark on its return from an aerial flight. The four-footed bird landed on a ledge of limestone, where we could see it plainly squat on its hind legs and smooth its ruffled plumage, after which it made for the creek with a flourish of its tail, took a good drink, and scampered away into the willow-thicket."

In the light of this recital, we now like to think that squirrels probably are not injured even if they should fall during their sometimes frenetic racing about trees and through the woodland canopy.—W. L. M.

# The Starfish; Hydraulic Engineer

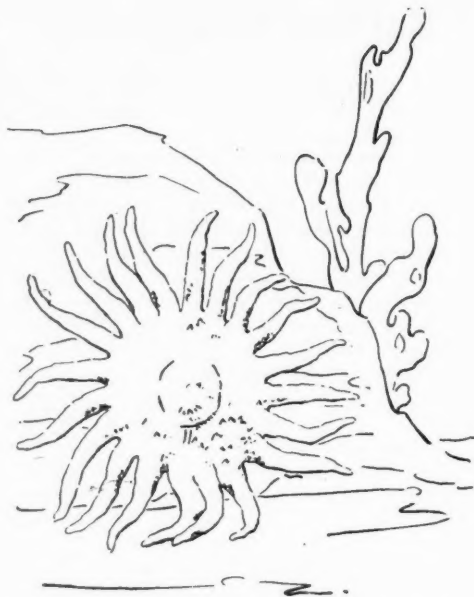
By MURIEL LEWIN GUBERLET

*Drawings by Jan Ogden*

**M**AN is pretty proud of his scientific inventions and their applications to present-day living, but if we look back at the animal world we learn that the so-called lower seashore animals anticipated some of man's inventions by millions of years. For example, the hermit crab made the first automobile trailer; the clam worm holds the patent on the caterpillar tractor; the octopus perfected the smoke screen; and the starfish was the inventor of the hydraulic locomotor system.

The old saying that necessity is the mother of invention accounts for the animals' achievements. And necessity certainly demanded that the starfish do something about his myriad wayward feet. A starfish has thousands of feet, each wanting to go its own sweet way, so he had to devise a plan to make them work together. Only in union is there strength. A hydraulic locomotor system was the solution.

I suppose a starfish is called a starfish because, like the stars that twinkle in the sky, the body is broad and flat and radiates out into points. These points are called rays. Most starfish have five rays; however, many have more than five. One little green fellow has six rays, and the giant sunflower starfish has twenty, although he sometimes misses one or adds



**Most starfish have five rays, but the giant sunflower starfish boasts a complement of twenty.**

another for good measure. The number of rays, depending on the species, varies from five to twenty.

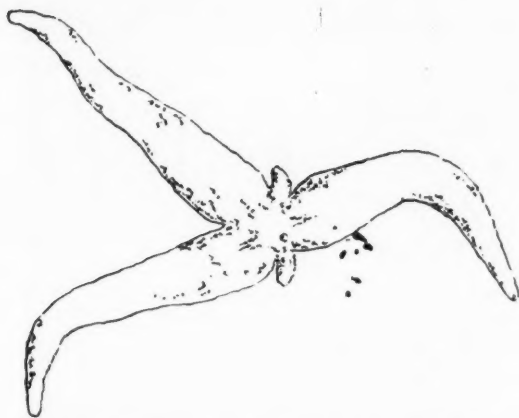
Running the length of each ray, on the under side of the starfish's body, are grooves, and in the grooves are the feet. In reality the feet are tiny, hollow tubes like medicine droppers. This is where the pumping system begins to work. Water to operate the feet enters the animal's body through a round hole on the upper side near the center. This serves as an intake pipe. The water is carried through circular and radial canals to the tube feet. Reservoirs at the bases of the feet fill and withdraw the water like suction bulbs of medicine droppers. As a result of absorbing and releasing the water, the animal moves forward with a regular gliding motion, not fast, to be sure—probably about three inches a minute. However, the system works perfectly.

A starfish uses his feet for many other purposes besides walking. In fact, his whole mode of life is built around his feet. Since a starfish has no head, he makes up for it by working his feet overtime.

A starfish has no permanent home, but his feet anchor him securely wherever he happens to be. He enjoys living on rocky shores where the tides beat hard. If he were not fastened securely, he would be dashed about willy-nilly, but his feet clutch the rocks with a vise-like grip. Individually, each foot is not strong, but great numbers of them, all pulling together, are powerful. It is estimated that the sunflower starfish has 40,000 feet. Try to pull one big fellow off a rock and you will see how strong his feet are.



**A starfish wraps its rays about a clam and then there is a tug-of-war the starfish always wins.**



Losing an arm, or ray, in some mishap, the starfish has the ability to grow a new one in its place.

Of course, the feet of the starfish are useless when he is out of water. The pumping system stops completely. When you see a starfish on an exposed beach he is stranded and has to stay there until the next tide releases him. No doubt he was not attending to business when the tide began to fall. The tube feet of a starfish cannot operate without water, any more than an automobile can travel without gasoline.

When the locomotor system is working smoothly, the starfish wanders along the beach at his pleasure. But usually his travels are in search of food. Nothing daunts him when a good meal is in sight. Although the starfish does not have a head, he has a mouth, which is in the center on the under side of his body. Leading from the mouth is the stomach. The strange fellow has an enormous appetite, and is utterly ruthless in getting his food. If he sees a clam or oyster on the beach, he sneaks up behind the unsuspecting mollusk and pounces upon him. After climbing on top of the victim, the starfish attaches his tube feet to the shell and begins to pull. He pulls and tugs with all his might. Terrified, the clam tries as hard as he can to keep his shell closed. The result is a tug-of-war, but the starfish always wins. The clam gets tired and the muscle tension is released. The shell then pops open and the starfish sucks out the juicy clam.

Sometimes the starfish is so greedy he swallows the clam, shell and all. If the clam is too large to get into the starfish's mouth, he forces his stomach outside and digests the clam without benefit of the mouth. He later spits out the shell and puts his stomach back where it belongs.

Being without a head, the starfish resorts to all sorts of makeshifts. The brunt of these adjustments falls upon the rays and feet. They even pinch-hit for sense organs. The tube feet near the ends of the rays are not for walking, but play the role of nose and feelers. They scent out dangers and direct the ani-



The starfish is quite an acrobat and can turn a clever hand-spring in slow motion if necessary.

mal's comings and goings. At the extreme end of each ray is an eye spot—twenty if he has twenty rays. These make-believe eyes are sensitive to light but cannot distinguish objects.

The rays and feet are so important to the starfish that Nature made a special dispensation in regard to them. If, through an accident, a starfish loses a ray, he grows a new one. Sometimes a whole new animal develops from a severed ray. If a mishap is imminent, a starfish often deliberately breaks off a ray because he realizes it is better to sacrifice a limb than to lose his life. There are no wooden legs or artificial arms in the seashore world.

Strange as it may seem, the starfish is the hand-spring expert of the beach. Because he is broad and flat, it is quite a feat to turn a hand-spring. But the starfish does this clever trick by lying on his back and doing a flip-flop with one of his arms. Some years ago a professor was trying to find out how much intelligence a starfish had. He tied a red string around one ray of the starfish and taught him always to use that ray when practicing his setting up exercises. One animal was trained to do this in eighteen days, and after seven days still "remembered" which ray to use.

Starfish are particular about their personal appearances. They have beautiful clothes—red and yellow, blue and purple, and all the shades between. In fact, they stole the colors from the rainbow and appropriated them to their own use. In order to keep their fine garments spic and span, the starfish brush and scrub themselves hour after hour. Because the upper surface of the starfish is hard and rough, sand and debris naturally cling to it, but scattered over the body are scissor-like spines, which are on the lookout for dirt. The spines grasp the offending particles and hurl them away. Because of their elegant clothes and fine grooming the starfish are notable. But, Mr. Starfish's greatest achievement is as an engineer.



Cro-Magnon man was responsible for this engraving of a prehistoric horse, made on the wall of one of his caves with a stone as an engraving tool.

## Miracle at Altamira

By EDWIN D. NEFF

This is the third of three articles, bringing up to date, in popular terms, what we now know of prehistoric Man.

*Illustrations from Comte Begouen, Toulouse, through the Smithsonian Institution*

IT WAS enough to frighten any little girl, even though her father was nearby with a lighted candle. Here they were in a far-off corner of an inky cave, exactly where you would expect to find ghosts, goblins and witches. But when black-eyed Senorita de Sautuola glanced upward to the candle-made shadows dancing across the cave ceiling she saw something even worse than ghosts.

"Toros, Toros!", she screamed.

Daddy was poking around on the cave floor, but when he saw where his daughter was pointing he beheld one of the most brilliant pages in the whole story of man. There on the low ceiling of the cavern was an exquisite portrait of a huge, horned bison,

illuminated in red and black ochre. It was a painting created by men many thousands of years before the first academies, yet not to be equalled until the Minoans of Crete conceived their masterpieces.

It was the Marques de Sautuola who told the story of his little girl's discovery in the Altamira cave, deep in the Spanish Pyrennes. This was in 1879, a year after he had seen the Exposition at Paris—a visit that inspired him to search for relics of ancient man in his native Spain.

Many years later—in 1926—when the little girl had become an old lady, an anthropologist visited her in Spain for a first-hand account of the famous incident at Altamira. It was, in a small way, an exciting mo-



**With this carving of a pre-historic deer, Cro-Magnon man left us a page of illustrated natural history of a day long ago.**

ment in anthropology, and the scientist-reporter was eager for the old lady's story. But, alas, her reply was an anti-climax, if entirely honest.

"I don't remember a thing about it," she snapped.

Long before this, of course, the original bison had been copied, at first by candlelight, later by electric lights installed by the Duke of Alba. Modern lights revealed a whole legion of animal paintings on the cave ceiling, missed by candlelight.

You might suppose that the Marques and his daughter had become the toast of anthropology, especially since he had published at his own expense an account of his discovery—a discovery that he evaluated properly even though he was an amateur. Unfortunately, the savants of his day missed the whole point of the horns, which the ancient man had painted beside the bison's snout, and which, of course, had caused the sharp-eyed little senorita to cry "Toros," Spanish for "Bull." Later, anthropologists realized the horns pictured in accurate detail the fossil, not modern, bison, a fact that helped to establish the great age of the painting.

This was the first discovery of cave art. And so our story begins when a child raised her eyes in Altamira. It is the story of Cro-Magnon men, who, in a sense, were the first men to raise their eyes above the struggle to survive, and to attempt to interpret the world about them.

These were the splendid men; the tall, powerful men, emigrating, perhaps, from Central Asia into North Africa, then across the land-bridges of the Mediterranean, some 25,000 years ago. They swept back the brutish Neanderthal men in southern Europe as our American red men were swept back and vanquished in recent moments of history.

The remains that Cro-Magnon man left us, skeletal and cultural, tell a more evasive story than the straightforward struggle against cold and hunger that stamped the more primitive Neanderthal men. Here is something more than the endless hunt; the hud-

dling together in caves to fight off the glacial blizzards. Here is the warmth of human imagination; the first bright flicker of something we call "spirit," distorted, however, by the evil shape of sorcery. For sorcery is something else that seems to have appeared for the



**This party of explorers pauses at the entrance of Cro-Magnon man's cavern to record an exploration in 1912**

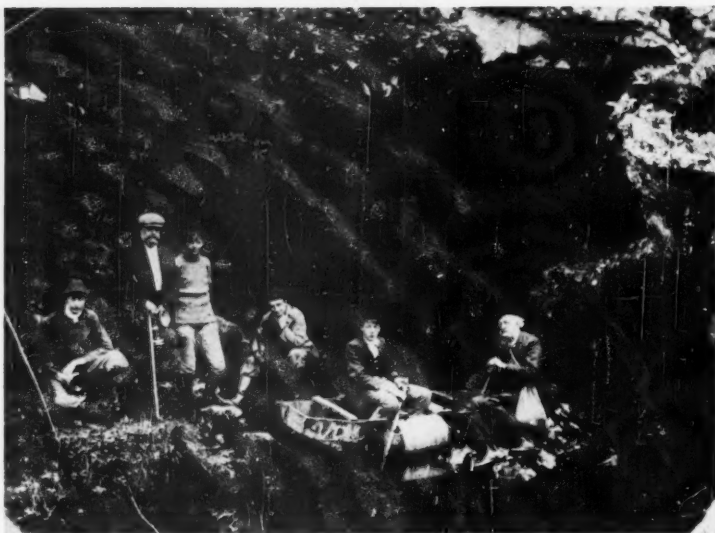
first time with Cro-Magnon men.

It is the howling, screaming, witch-dance kind of sorcery, practiced in forgotten pockets of the earth by the macabre light of torches. Art and sorcery are linked together, and linked again with the hunt. Cro-Magnon men did not create their magnificent paintings or their animal statues—another Cro-Magnon art form—to amuse the public. There were no centrally located art galleries with neat little labels under each picture 25,000 years ago. Cro-Magnon paintings, alternating sometimes with sculpture, are always located in the remotest possible parts of caverns. The artist might have had to swim hidden streams to reach them. Obviously, no "crowds" were wanted in these galleries—no idle gapers.

Nearly always, the painting and sculpture represent animals, usually food animals. Sometimes weapons are painted so they appear to pierce the animal in a vital spot. In the French cavern of Trois Frères a picture of the sorcerer himself was discovered, high on the cavern wall, dominating the whole scene. It is the figure of a man, but with long, hairy ears, stag horns, pointed beard, a horse's tail, and human legs. The figure seems to be in a posture of the dance. It all seems to add up neatly—art plus sorcery equals good hunting. Cro-Magnons, evidently, were strictly practical artists.

But Cro-Magnon's advance over Neanderthal is by no means limited to his paintings, sculpture and other art forms, including the distorted little human figurines. His weapons are beautifully chipped flint, rather than the crudely hacked flint points of Neanderthal. He probably had discovered the bow and arrow; and bone needles, often found with Cro-Magnon remains, suggest he even wore clothes of a sort.

How does one account for these advances? Part of the answer is weather. When the earliest Cro-Magnons appeared in Europe, the great glacial cold, through which Neanderthal men battled to stay alive, was beginning to lessen, and the climate was dryer. With this climatic change came more abundant animals, and with more abundant animals came a better life for men. Less time was needed for hunting, and more time was left for discovery, invention, and, as we have seen,



creative art. Thus culture was staging a beginning.

And Cro-Magnon was quite a different kind of man from Neanderthal. He was modern *Homo sapiens*, while Neanderthal was a step lower on the stairway of evolution. Cro-Magnon's skeletal remains disclose a massive brain case, a fine brow (as compared to Neanderthal man's low brow and heavy, ape-like brow ridges); relatively long forearms and shins; a broad, short face, as compared to Neanderthal's "thrust-down" face; a high, narrow nose (Neanderthal's was low and wide); a chin thrust forward in a pugnacious manner. This latter is an important point, for the "chin eminence" is "*sapiens*" while the chinless, lower jaw of Neanderthal is ape-like. Cro-Magnon was unquestionably a better, faster, more graceful hunter than Neanderthal man. He stood erect, for one thing, while Neanderthal walked with a strange, bent-knee shuffle.

It seems probable that Cro-Magnon men were more numerous than Neanderthal men, owing to the better climate and the more plentiful food. This, too, is a factor in Cro-Magnon's favor, for the more men born, the greater the chance for that rarest phenomenon, the original mind.

Cross-fertilization of cultures is another factor aiding Cro-Magnon. We have used the term "Cro-Magnon" in a somewhat general sense, covering a whole type of men. Their first appearance in Europe has been tentatively set at 25,000 years ago, perhaps longer. In his recent book, *The Races of Europe*, Carleton Coon, formerly assistant professor of anthropology, Harvard University, places the end of the Cro-Magnon period at 11,800 years ago on the basis of geological evidence. Certainly during this period there were many "invasions of Europe," each, perhaps, with a slightly different (Continued on page 48)

# As We See It

An Editorial

## Our Lip Is Trembling, Kristin

**P**ERHAPS with tongue in cheek—or maybe not—the editor of *Field and Stream* presents, in his November issue, a piece entitled “I Just Like to Kill Things,” by a lass named Kristin Sergel. It is an opus calculated to raise the hackles of those who do not happen to go in for gunning, and to set the red-capped gentry to saying, “That’s my gal!”

Says Kris—may we call you Kris, dear?—“I’m sick of letting thin-blooded, tongue-clucking do-gooders make us feel guilty every time we pick up a rifle. In the name of heaven, let’s stop apologizing for the most wonderful sport in the world . . . when someone asks me today why I hunt the dainty creatures of the field, I answer, ‘Because I just like to kill things.’ . . . Of course, there is much more to it than that, but how can you describe the joy of hunting to a lip-trembling ‘holier-than-thou’?”

Since Kris took down her back hair, we might confess a bit, too. We like our highball—bourbon or scotch—our regular ration of nicotine, a salty story now and then, and have a fatal weakness for drawing to the inside of a straight. But we *do not* like to kill things. So, I reckon, our blood must be mostly a limpid stream; we are a holier-than-thou do-gooder, and our lip is just trembling to beat the band.

“How,” writes Killer Kris, “can you make these people understand hunting—the smell of a cool breeze coming off the pine tops, the taste of mountain blueberries, the feel of a smooth steel mechanism in your hands, and as you seek the wary and magnificent ram in the highest ridges, the stirring of instincts that are old and deep in the race of man?”

Somehow or another, Kris, we never have found that a cool breeze off the pine tops, or the taste of mountain blueberries, are joys exclusive to those cooling their little pink fists on smooth steel. And our lip trembles frantically as we recall that certain satisfaction when a ram we had been tracking to photograph disappeared—alive—over the ridge above Maligne Lake and in the general direction of the Columbia Ice Field.

Kris dusts off the old one about how we like mutton—spring lamb for us, Kris—from the stockyard, which makes us just as much of a baddy as she is for liking her mutton wild and out of the shale slopes of the Rockies. And, of course, Kris comes up with the usual cutie about the antiquity of hunting, which makes “a sport based on it as natural as

breathing.” Somehow, we have never been able to see just why the fact man had to kill wild animals to live, in his early progress from his Cro-Magnon cave to his Fifth Avenue cave, has anything to do with sport killing. There are some 130,000,000 people or more in this country who do not shoot for fun, Kris.

Our sturdy nimrodette is pretty certain that “the hunter returns from his trip so much more refreshed than does a botanist with his field guide book.” How Kris can be so certain about this we do not know. We have seen a lot of mightily refreshed people come back from pack trips and trail trips on which they never shot so much as a pair of dice.

Getting right down to brass rivets, Kris, we fail to see any answer to the purely ethical assertion that it is wrong to take life—any life—for the fun of it. On the other hand, we have never been able to go along with the idea that anyone who legitimately kills a game animal is a moral leper. We will confess that, to us, a dead duck, or deer, or squirrel is a very sad looking thing. We would not get any pleasure out of making it that way. Yet we can see the moment of thrill that would come from making a clever wing shot, even though we would rather see the bird still on the wing. If that makes us a do-gooder, we are it, and there are a lot of us.

And in connection with this holier-than-thou concept, we are a bit tired of the superior parading of hunters boasting about how they pay for the game. What they pay is peanuts compared to what they take, and their contribution is for selfish reasons only. Gunners didn’t put wildlife there in the first place, and they own no exclusive rights to what is left of it. Furthermore, the last thing they want is for any non-gunner to make a contribution to wildlife protection because he might up and demand that his share be left alive.

Okeh, Kris, so long as it is morally acceptable and legally permissible to kill things for sport you are certainly entitled to “just like to kill things.” That is something between you and your conscience. And, if we do not happen to think it is fun; if we find our thrill in the soar of a hawk, the flit of a deer through the forest, the live beauty of a wood duck, or the virtuosity of a mockingbird—and that makes us a lip-trembling do-gooder—then, Kris, I guess we will just have to let the old lip tremble.

# Chinese Vegetables— Interesting and Tasty

By ANDREW S. WING

**W**HY are Chinese meals so interesting? It is partly taste, to be sure, plus the mystery of not knowing exactly what one is eating. But the Chinese are famous cooks, and have been so for thousands of years. They eat all kinds of things that are unknown to occidental cooking, such as bird's-nest soup and shark's fins. They also consume quantities of such standard foods as eggs, beef, pork, duck, chicken, lobster, shrimp and other fruits of the sea.

But the main distinction of Chinese cooking, I think, is their vegetables, and their unusual ways of cooking and serving them. What are the Chinese vegetables that are different from ours? Let us take a trip to Chinatown in New York—or in any other large city—and find out.

Being a cosmopolitan people, the Chinese use a great many vegetables and cereals that are used all over the world. Some of these originated in China and other parts of the Far East. China produces and consumes a great deal of wheat, as well as rice, and the Chinese know how to cook rice better than most of our own cooks. They use onions plentifully, too, as do the Japanese. Spinach is also a favorite dish, and so are green peppers, but these are not specially oriental. Lettuce, tomatoes and other salad greens are not much used in the raw state, perhaps because their traditional methods of growing crops with night soil and other wastes makes unsafe the use of uncooked foods.

Chinese cabbage is perhaps number one on the list of the average Chinese chef. As we grow it, Chinese cabbage makes an elongated head and is commonly called "celery cabbage", because it has some characteristics of both, but it is not closely related to either, although a member of the cabbage family. Personally, I feel that Chinese cabbage is an underappreciated vegetable. When grown in cool weather, it makes a tight head of superior quality and always retails at a premium compared to ordinary cabbage and other greens. Cooked, it is delicious and mild. It makes good salad or coleslaw, and the blanched stems are fine to eat raw like celery, if you do not



Many fascinating vegetables go into the preparation of Chinese dishes, which hold the lure of mystery. Chinese cooks are outstanding practitioners, and have been for centuries.

mind a mild but rather distinctive flavor. The Chinese have many varieties of this interesting member of the cole tribe, and the ones commonly seen in Chinese markets and food stores have looser heads, with round, white stems. It is these, I believe, that are mostly used in chop suey and chow mein. For ordinary use, I suggest the varieties listed in American seed catalogs under "Chinese" or "celery" cabbage. Plant very early in the spring, or in late summer, and use insecticides to keep the worms off as you would do with ordinary cabbage and allied crops. Coolness and moisture are the main factors, culture being of the easiest if the rows are properly thinned out to about a foot between plants; the young plants are good for either salads or cooked greens.

When you go to Chinatown you may be mystified by the strange, weird and exotic looking things seen in the windows. Do not be repulsed by these because they look queer, for they are mostly wholesome, completely digestible and often delicious when properly prepared.

The Chinese melon, for instance, is a curious object that resembles an olive-green pumpkin covered with frost. Cooked in various ways, the flesh is delicate, like a Zucchini squash, only milder. Melon is also



boiled in halves, with vegetables and meat inside.

One thinks of ginger not as a vegetable but as a confection or flavoring that comes dried, or pickled in heavy syrup. However, the Chinese use fresh ginger roots, or rhizomes, in many of their dishes, especially meats. I now have one of these plants, grown from a bit of root, growing in my office window. It looks more like a little bamboo plant than anything I can think of, and I shall be interested to see what it will eventually become, if it proves to prosper there.

A visit to a Chinese kitchen is an experience. The one I saw was at the Pacific Restaurant, one of the newer and larger places in New York's Chinatown. The foods are partially prepared in the basement, and then moved upstairs. Almost everything, including both vegetables and meats, is diced rather fine, and the chicken is picked clean from the bones. All bones from chickens and other suitable meats are carefully saved for soup stocks. The diced foods are heaped high in large metal bowls that are brightly polished. Everything is spotlessly clean, including the white uniforms of the cooks.

The most exotic dish I watched being prepared was shark's-fin soup, which is made from the dried fins of the fish, cooked and separated. It did not look bad; likely its taste was delicious. One longs for the opportunity to sample most of the really famous Chinese dishes. To do this takes a little time, but is not necessarily expensive. The procedure is to take a party of four or five people and order a regular Chinese family dinner. For around \$2.00 each, you can enjoy quite a banquet of many dishes in true Chinese style.

Bean sprouts are one of the standard Chinese delicacies. These are usually made from the tiny, dark-green Mung (not soy) beans. They are not hard to sprout at home, but now come in cans for those who like to prepare their own Chinese dishes. Edible soy beans are another delicacy being widely grown in American home gardens. They are a little like lima beans, but have a delicate, and more distinctive flavor. Soy bean cake is also commonly used in Chinese cooking, and soy sauce is indispensable as a flavoring for all kinds of soups and meat dishes. It is also, I am told, the basis for almost all of the common meat sauces. The Chinese use a number of these interesting flavorings in their every-day dishes, most of which have a vegetable base, the principal one being,

naturally, soy sauce. Especially subtle and rich is oyster sauce; shrimp sauce is saltier and even more flavorful. A little sampling from a Chinese store, or a vegetarian food store, will enrich your knowledge of and skill in cooking.

Some of the common Chinese vegetables have been in our seed catalogs for years—with small acceptance from the public, more is the pity. The snow pea, for instance, is commonly listed by all large seed firms as an "edible-podded pea". It has long been relished

by the French, who are as skilled in the glorifying of vegetables as any nation, unless it is the Italians. This is one great Chinese delicacy that is easily grown in any fairly fertile garden, if planted early enough. The vines grow tall, must be staked or grown on wire, and watched lest the birds get them before you do, for they are sweet, tender and delicious. Cook them, pods and all, before the peas mature. They are so superlatively better than string beans that there is no comparison, and are just about as easy to grow. However, like all peas, snow peas must be planted early, must be well fertilized and picked while tender. These are commonly found in all good Chinese food stores or restaurants. They may be

cooked in various ways, but really need only a little salt, butter, and enough boiling, or cooking in a pressure cooker, to make them tender. Even raw, snow peas are sweet, tender and delectable.

Mustard in many forms is commonly grown and used by Chinese people. Do not scoff at this suggestion, for mustard greens are good. So are turnips and their green tops, which are also used in Chinese cooking. Parsley and many of the herbs are grown on Chinese-American farms and sold in Chinese food stores. But when it comes to Chinese herbs, I pass, for what the Chinese sell as "herbs" can mean anything from a dried seahorse, or "dragon" (lizard), to a piece of an ancestor's skull, or prize water buffalo. These herbs are supposed to have medicinal value, and maybe do if you know how to use them. Unlicensed Chinese "herb doctors" administer these age-old remedies to those who request them, but educated Chinese call in a licensed doctor when they are actually ill.

No one can deny that Chinese cooks have a definite flair for flavors, and that they can throw together an economical meal that has a combination of foods, all with distinct flavors and textures. Vegetables play



Fred Wing, Chinese amateur gourmet and author of a famous Chinese cook book.

an important role in the blending of such economical dishes as chop suey and chow mein, but when it comes to their special dishes served at banquets and family dinners, the vegetables are mostly cooked separately and with great care.

It did not just happen that the Chinese have a skill for cookery and the use of many kinds of foods, some unknown to our own kitchens. Remember, China is an old, old country. Their people were expert farmers, craftsmen, artists, poets and philosophers long before western Europe was civilized. It was only natural that, in those thousands of years, they learned how to cook. They also learned how to make an acre of land produce more food than any other people.

Their prowess as farmers is aptly summed up by Dr. F. H. King in his classic *Farmers of Forty Centuries*, first published in 1911. He writes that "in the Shantung province we talked with a farmer having twelve in his family and who kept one donkey and one cow, both exclusively laboring animals, and two pigs on 2.5 acres of cultivated land, where he grew wheat, millet, sweet potatoes and beans. Here is a density of population equal to 3072 people, 356 donkeys, 256 cattle and 512 swine per square mile.

"Nearly 500,000,000 people are being maintained", the noted Wisconsin professor continues, "chiefly upon the products of an area smaller than the improved farm lands of the United States. Complete a square on the lines of Chicago southward to the Gulf and westward across Kansas, and there will be enclosed an area greater than the cultivated fields of Korea, China and Japan and from which five times our present population are fed."

Professor King, of course, was writing about the United States when we had about 100,000,000 people, but what he said then is doubly true today with a 40 percent increase in population and soils no richer and available farm land less, if anything. What the Chinese do to preserve fertility we could do, but it does not entirely conform with our ideas of sanitation. In China, I believe, there are no modern sewage disposal plants. Instead of sending human wastes out to sea, they are returned to the land. In addition, extensive use is made of composts. Mud is dredged up from river bottoms, and the culture of every crop is most intensive. Instead of one crop a year, they get three or four. Irrigation is also widely practiced. But while they get much greater yields than we do, it is done with cheap, coolie labor, or by farm owners and

tenants who have a very low standard of living. With modern power machinery, we get much greater yields per man than do the Chinese. Yet we can still learn valuable lessons from their age-old methods of land utilization and the maintenance of soil fertility, so vital to the survival of the human race. The current popular interest in organic gardening through the utilization of plant wastes and the encouragement of earthworms is a healthy trend in that direction. So is the nationwide and official soil conservation program.

To see how Chinese vegetables are grown, I took a 40-mile drive out to the Lichee Farm at Wantagh, Long Island. This is no show place, the house being a

rather old and typical farm house, and the 75 acres of crops resemble, at first glance, the ordinary truck farms of the region. Leong Poon, gray-haired manager and one of the owners, was working with a group of Chinese farm hands at the far end of a field of Chinese cabbage. After greeting me in broken English, he examined my card of introduction and turned me over to Adam Chou, a tall, handsome lad who is studying scientific agriculture at Virginia Polytechnic Institute. Adam spoke excellent English and was glad to knock off work and show me over the farm. He also told me of his

## Suggestion

By JON, KARIN, and LIEF AHRENS

Fifteen cents was the measly sum  
That we could spend for bubble gum.  
But we three kids just didn't do it;  
We bought, instead, a chunk of suet.  
We slipped it in an onion sack  
And nailed it to the elm out back;  
Then came inside, stamped off the snow,  
(We just laugh when mad winds blow.)  
And soon our elm had friends galore:  
Black-capped chick-a-dees, half a score;  
A red-capped downy, his plain-capped mate,  
Hung round the elm, early and late.  
Tufted titmice came to call . . .  
One hardly had a tail at all!  
Our tree had lots of ornaments,  
All for that measly fifteen cents.

ambition to return to China and introduce our scientific farming methods, including what he calls "chemical farming". Whether our mechanized methods and the use of chemical fertilizers instead of organics will work or not, I frankly do not know, and I did not argue the matter with him. Maybe a combination of the best of the old methods with the new is what China needs.

At Lichee Farm, everything is mechanized. Tractors plow, harrow the soil, pull the seeding machines, and draw the sprayers that douse the bugs on a 30-foot strip of growing crops. The crops are planted in raised sections just wide enough for a tractor to straddle. Vegetables are planted close, in rows, and thinning, weeding, and harvesting must be done by hand. It seemed to me that some of the crops were planted too closely in the rows, requiring a lot of wasteful thinning. But who was I to criticize methods that so obviously were producing good crops and with a relatively small crew? Except in midsummer, during the peak of the season, the regular crew of about eight men does all the work; then American women are employed, no Chinese women being available. In winter some of the Chinese crew under Leong Poon move to a southern farm near (Continued on page 52)

# The Oregon Myrtle

## A Vanishing Forest Tree That Needs Friends

By JANET MOORE

THE area that includes the southwest corner of Oregon and the northwest corner of California has been called a "botanist's paradise." Here, besides the general flora of adjoining coastal areas, one finds plants peculiar to this territory alone. Among these is the tree known as Oregon myrtle, *Umbellularia californica* in scientific parlance. Among other common names given it are bay tree, pepperwood and California laurel. Although identified botanically with its California sister, the myrtle attains a degree of perfection in Oregon's moist bottom lands not possible in its dryer, more southerly range. And although it resembles in certain respects both laurel and myrtle, botanists say it cannot be conventionally accepted as either.

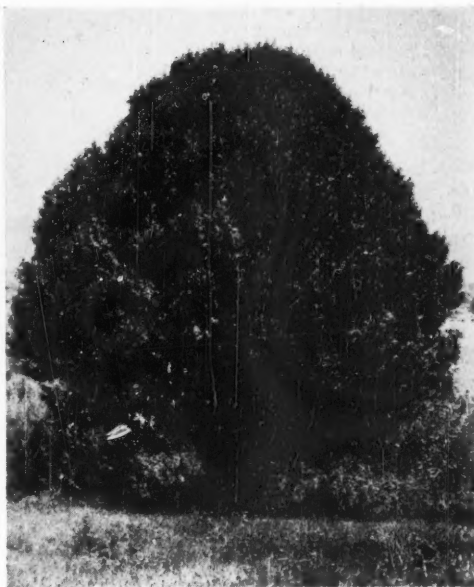
The Oregon myrtle, little known outside its limited range, is a unique representative of a family otherwise confined to tropical or semi-tropical regions. It should not be confused with the myrtle of the Holy Land, the *Myrtus communis*, with which commercial advertising frequently links it. The main resemblance to this species is in the aromatic camphor odor of the crushed leaves and bark, which is rather pleasant but almost too powerful.

The Oregon myrtle is a beautiful and distinctive tree, evergreen and heavily foliated. In virgin forests it rises to a height of one hundred or more feet, and may boast a trunk several feet in diameter. Some specimens grow straight and columnar; others have multiple trunks of fantastic shapes, much deformed by burls. When standing alone, it develops a shapely, well-rounded form that would make the species ideal for lawn use if it were more tolerant to transplanting, and to soil and atmospheric conditions unlike those of its native habitat. Second-growth trees are smaller and dome-shaped. In higher altitudes it appears as

PHOTOGRAPH BY GWADYS BOREN



FOR JANUARY, 1949



PHOTOGRAPH OREGON STATE HIGHWAY COMMISSION

A myrtlewood tree is beautifully formed and would be an attractive ornamental were it more tolerant of transplanting and a change of environment.

On bluffs facing the ocean green mat of prostrate stems. In the River Valley in the Siskiyou Mountains are abundant. Here grow the largest trees, interspersed with alders and broad-leaved trees. A considerable part of the forest floor is light sifting through their foliage to create a pattern of light and shade over the basal growth of wild flowers. The trees present a picture that would have delighted the heart of Corot, the French landscapist who painted many such sylvan scenes. One can almost fancy his nymphs dancing among these graceful monarchs of the forest.

The foliage of the Oregon myrtle is dense, a dark, glossy green and non-serrated. New leaves form through the summer, and remain on the tree from two to six years. When mature they are a deep yellow-green, and three to five inches long. They yield by distillation a pungent volatile oil that, in recent years, has been used in the manufacture of myrtle perfume.

The inconspicuous white blossoms develop into a yellow-green fruit, similar to an olive. It yields a fat containing umbelliferous, or aniseic, acid. The fruit matures in

Myrtlewood novelties are greatly in demand. The wood finishes with beautiful color and polishes to a sheen that accounts for its popularity.

Now and then twenty-five-foot stumps are found, liberally pocked with burls that are valuable for myrtlewood products.

October and soon falls. Washed down by streams, the seeds germinate freely and furnish a shady covering along canyons and gulches, thus perpetuating colonies in otherwise dry foothills.

The tree is slow of growth and long-lived. Specimens twenty to thirty inches in diameter show as many as 160 to 210 annual rings. The wood is heavy, hard, strong and close-grained. It is the most expensive wood produced in Pacific North America, and is used for interior finishing and cabinet work. When polished no other wood excels it in beauty of grain. Fine examples of myrtle wood panelling are to be found in Oregon's new State Capitol.

The wood is likewise in demand for the making of turned objects, such as nut bowls, sandwich trays, candlesticks and lamp bases. These art novelties are the form in which most natives, as well as tourists, become acquainted with this beautiful wood, for the myrtlewood shop occurs almost as frequently throughout Oregon as the well-known agate shop. Like agate and petrified wood, the myrtle takes a glossy, velvety polish, inviting to the touch as well as the eye. Its prevailing light brown tone is highlighted by mottled areas of creamy-white and chocolate-brown, sometimes verging on red. Naturally, the burl specimens are most desirable for all decorative purposes.

Because of the demolition by early settlers, and more recent logging operations, virgin stands of this distinctive tree are fast disappearing. The small, dome-shaped ones seen in logged-off pastures and along highways cannot rival the beauty and grandeur of the original specimens. Today there are few of these giants remaining, and most of these occur in more



PHOTOGRAPH BY GWYNETH BOWEN

inaccessible regions seldom visited by the average citizen. Most national forests are too high to harbor this tree, which, whatever its name, is unique.

A "save the myrtles" campaign has recently been launched with the hope that it may do for the Oregon myrtle what "save the redwoods" did for that tree in California. Ironically enough, it took a middle-west visitor to instigate this movement. An area near Myrtle Point has already been acquired as the site of what will probably be the first myrtlewood park in the world.

Thornton T. Munger, recently retired director of the Pacific Northwest Forest Experiment Station, tells of an old-timer who has resisted the temptation to sell his holdings of first-growth myrtle to loggers. He is saving this remnant as a reminder of the many he felled and grubbed in his youth while clearing his farm. The plan of the campaign is to acquire such groves as this to be set aside as State property and made accessible by highways "so the public may come to know and appreciate this now rare forest type at its optimum," and keep it safe from man's interference.



## Lost and Found

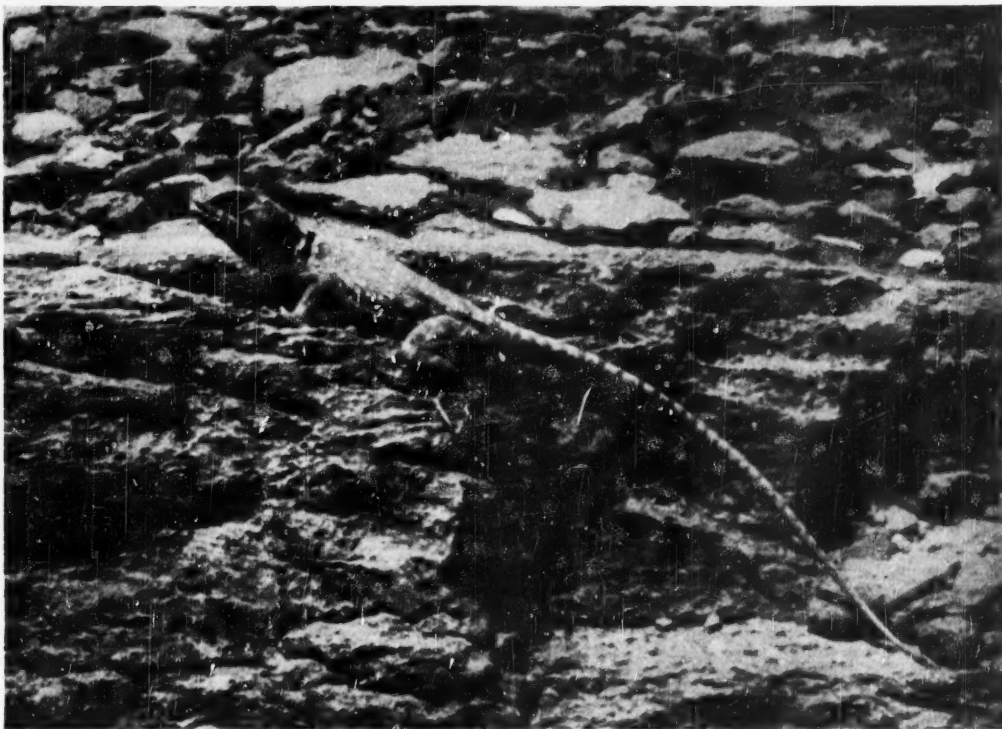
By REBA GOBER FORD

The rainbow that last night  
haloed the hills  
And ended in our lane  
Is gone;  
But I know where the broken  
pieces are.

They're scattered past  
all picking up—  
Red fragments on a maple,  
Violet and indigo upon the  
forest floor,  
Orange and green across the  
mountain top.

And yellow . . .  
Well, the impish sprites  
That smashed the rainbow  
sliding down  
Fell right into the pot  
of gold  
And flung it all around.





Warily and alertly perched upon his rock, the collared lizard surveys the photographer with a bright eye and seems to be asking, "What is this guy up to?"

## Mister Boomer—Collared Lizard

By JAMES G. HARLOW

**M**EET Mr. Mountain Boomer, known to the books as *Crotophytus collaris*, a Southwestern gentleman with a personality all his own! Throughout his homeland region, he bears on his scaly back a most unsavory reputation—sustained by purely legendary traits. He is credited with extreme venomousness, the speed of the wind, and even the ability to change the sex of the victim of his bite. Like many questionable reputations, however, his vanishes upon closer acquaintance, and in its place one finds one of the few North American lizards that hold a well-developed conviction that, in the case of trouble, Heaven helps him who helps himself. When cornered, he exhibits a viciousness and enthusiasm for battle that excite thoroughgoing respect—and prolonged tenderness in the region where he centers his attack.

Measuring a scant twelve inches in length, Mr. Boomer is equipped with a remarkably heavy head and jaws. When an adversary leaves him an oppor-

tunity, they are used with great effect. After making the pictures that accompany this story, my hand was bleeding from fifteen or twenty skin punctures from the needle-like teeth. Given a chance to escape, Mr. Boomer usually makes an attempt, rising on his powerful rear legs, much like his giant relative of a few million years ago, the terrible *Tyrannosaurus rex*. Pursue him closely, or corner him under his protective rock, and he whirls, jaws agape, hind quarters flattened, front quarters reared, and advances to the attack. Angrily, fearlessly he moves toward his aggressor until he is close enough for a leap. Then comes a quick jump, a powerful bite, and, while you are recovering from your surprise, he is off again at a terrific rate. His reputation often makes him a target for small boys' sling shots, BB guns and 22's, but his speed and pugnacity keep down the casualties.

During most of the year, Mr. Boomer is a dull brown, but in the spring, his season for mating, he



From the startled expression on the lizard's face, one might imagine the observation, "Gosh, I'm caught."

changes his protective colors for a striking coat of blue-green, yellow and orange, while Madam Boomer merely brightens her earthy hue. After the mating season, the traditional sartorial conservatism of the male reproduces the safer brown.

Sir *Crotaphytus collaris* may be found on dry, rocky ground, roughly from Nebraska south through Texas, between the Mississippi and the Rockies. His tribe includes four cousins, all of whom resemble him, and who look after the family in the far Southwest.



But, if the captor has a different grip, the lizard could be imagined to remark, "Okeh, mister, you asked for it."

Like all rough people, Mr. Boomer, too, has his sensitive, artistic side. He likes to eat flowers, particularly small ones. This weakness is offset, however, by his willingness to eat anything else that will pass down his capacious gullet, other lizards not excepted. Could there be anything to the possibility of inheritance of disposition across a few million years? It has been a long time since *Tyrannosaurus*, who also ran on his back legs, but Mr. Boomer surely has his frame of mind, if not his bulk, for prehistoric life.

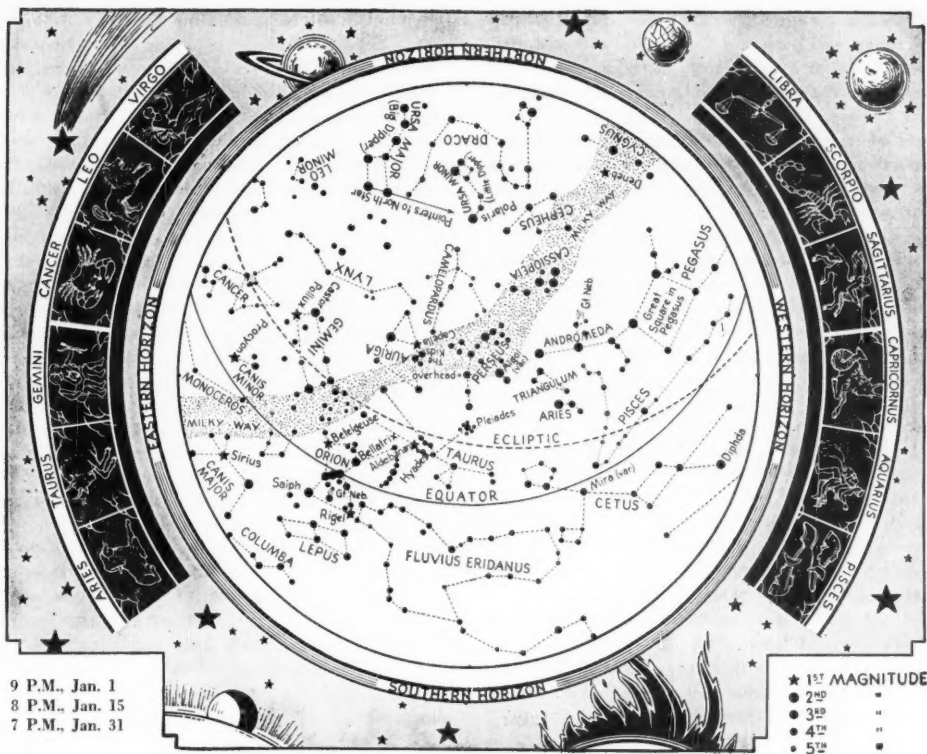


## Portrait of My Grandfather

By WILLIAM ARNETTE WOFFORD

This is his land he loved until he died.  
There was no place for him except the earth,  
This warm, rich Southern earth that gave him birth,  
And which bequeathed to him his greatest pride.  
Here are his rows of cotton in the sun;  
His heavy-laden orchards, sweet with rain;  
And here, his fields that yielded him rich grain

In which he worked from dawn till day was done.  
Old Enoch had peace in his heart, and so  
His three score years and ten of endless toil  
Were happy, speaking to the ancient soil.  
Seeming a part of it so much, I know  
He rests, contented, in the earth's rich loam,  
Like one long absent who at last goes home.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

## The Heavens in 1949

By ISABEL M. LEWIS

**D**URING the year 1949 the gradual decrease in solar activity will continue. The sunspot maximum was reached in June, 1947, and from then on there has been a slow decline in the number of sunspots and sunspot groups—as well as magnetic storms, auroral displays—and in the amount of ultra-violet radiations. The present sunspot cycle has broken all records for size of great individual spots and the total area covered by great sunspot groups. Even though a decline in all forms of solar activity is now noticeable, great individual spots, or groups of spots, may appear on the surface of the sun at any time during the cycle, which, from minimum to minimum, averages about eleven years in length.

In 1949 there will be four eclipses—two partial eclipses of the sun and two total eclipses of the moon. The first partial solar eclipse, occurring on April 28, will be visible in the north polar regions, the north

Atlantic Ocean, Greenland, Iceland, the British Isles, Europe, northwestern Asia and the extreme northwestern part of Africa. The greatest magnitude, which will occur near Greenland, will be only about sixty percent. The second partial solar eclipse will occur on October 21. It will be visible in the south polar regions, New Zealand, and all of Australia except the western and northwestern part. About 96 hundredths of the sun's diameter will be covered by the moon, at time of greatest eclipse, at a point in Antarctica where the greatest phase occurs. The magnitude of the eclipse in Australia and New Zealand will be much less than this amount. The two total eclipses of the moon that will occur in 1949 will be visible in all parts of the United States, and Alaska. The first will occur on April 12. Eastern Standard Time, and will be visible in North and South America, the Atlantic Ocean, the Arctic and Antarctic regions and, to some

extent, in Europe and Africa. The second total eclipse of the moon will occur on October 6, and will also be visible in North and South America, the Arctic and Antarctic regions, Atlantic Ocean, and the greater part of Europe.

The planet Mercury, because it is always so close to the sun, can be seen to advantage only near the time of its greatest elongations, or greatest distances to east or west of the sun. At eastern elongation—that is, when it is east of the sun—it is seen in the evening sky, and at western elongation in the morning sky. The most favorable *eastern* elongations in northern latitudes, when it is best seen in the evening sky, are the ones that occur in the spring, and the most favorable *western* elongations occur in the early fall, when the planet is seen to the best advantage in the morning sky. The planet may usually be seen for a week or ten days before and after the dates of its elongations, without telescopic aid, in the evening or morning twilight, according to which elongation it is near. Its appearance then is that of a brilliant star, resembling Vega. In the telescope, like Venus, it exhibits phases similar to those of the moon. The time required for Mercury to pass from eastern to western elongation is about 44 days, with *inferior* conjunction with the sun coming halfway between these dates. The planet takes about 72 days to pass from greatest western to greatest eastern elongation, with *superior* conjunction with the sun coming halfway between these times. During the year 1949, Mercury will be at eastern elongations on January 17, May 10, September 7; and at western elongations on February 28, June 28, and October 19. It will also be at inferior conjunction with the sun when it passes from the evening to the morning sky, on February 2, June 3 and October 3. The dates of superior conjunction, when the planet passes from the morning to the evening sky, and is farthest from the earth, with the sun between earth and planet, are April 13, July 26, and November 21. The little planet will be in conjunction with Mars three times this year: on January 7 and 27, and again on April 8. It will be in conjunction with Venus on February 10, April 12, and May 27, with Saturn on August 13, with Uranus on July 11, and Neptune on September 12 and 27, and October 25. This is quite a record for this little planet, which had only four conjunctions with other planets in 1948.

Venus will be found low in the southeastern sky before sunrise, early in 1949. It will be in superior conjunction with the sun on April 16 and will be too

close to the sun to be seen for some days before this date. On January 26 there will be a most remarkable conjunction of Venus and Jupiter, when the planets will be only one minute of arc apart at time of closest approach. This is so close that, viewed without the aid of a telescope, the two planets would appear to be blended into one. The exact time of conjunction will be 3:00 A.M., Eastern Standard Time, when the two planets have not yet appeared above the horizon in the United States. By the time they become visible in the eastern portion of the country the separation will be greater, and the two should have the appearance of a close double star. As the two planets are not far above the southeastern horizon in the morning

sky at this time they may possibly be lost to view in the morning twilight, especially if there is haze near the horizon. At the time of superior conjunction with the sun on April 16 the sun lies directly between Venus and the earth. The planet will have the phase of full moon at this time, but cannot be seen from the earth for some time both before and after conjunction because of nearness to the sun. It then passes from the morning to the evening sky, and will next be seen low in the northwest in the evening twilight. Venus will then improve its position in the evening sky gradually, appearing higher above the horizon and brighter

on successive nights until it reaches greatest eastern elongation on November 20. It will then begin to decrease its distance above the horizon again, although increasing in brightness as it draws nearer to the earth. It will attain its greatest brilliancy on December 26. From early summer until the end of the year it will be seen in the evening sky as a magnificent Evening Star, surpassed by none in splendor and improving in position and brilliancy as the months pass by. In addition to its conjunctions with Mercury and Jupiter, already mentioned, Venus will be in conjunction with Mars on April 2, Uranus on June 7, Saturn on July 31, Neptune on September 1, and Jupiter, for the second time, on December 6.

Mars starts the year in the evening sky so close to the southwestern horizon that, without a telescope, it can be found with difficulty, if at all. It will not be favorably placed for observation from the earth until the end of the year. On conjunction with the sun, on March 17, it will pass to the morning sky and will be seen some weeks later low in the eastern sky shortly before sunrise. Its distance from the earth will continue to increase until May 7, when it will be about 223 million miles away. (Continued on page 50)

## What if the Dawn

By MAE WINKLER GOODMAN

What if the dawn should oversleep,  
Or if she should forget  
To tuck the moon and stars away  
Into their sapphire bed

And then tie all the curtains back  
(Stained deep with cobalt dye)  
And fling the shutters wide across  
The casement of the sky . . .

Oh, if she would forget just once  
To lock the swinging doors  
Of night, and day came dancing  
Down avenues of stars!



# Classroom Conservation

By HERMAN QUICK

As a high school English teacher, it is my pleasure (and agony!) to teach advanced students some of the conventional techniques of "creative" English composition. Drama and conflict, suspense and surprise endings—these narrative devices are routine discussion topics.

Equally routine are the usual creative writing talks on the myriad subjects and methods that all writing teachers and students are required to master before superior work can be achieved. The task of learning how-to-do-it processes seems endless. Students, accordingly, squirm and fret and wail. And they ask questions!

If you are a prospective English teacher, or if you are already in the English teaching profession but have not as yet had to teach a creative writing class, you may wonder what specific questions an experienced writing instructor finds he most frequently has to answer.

That's a big order! It would take several issues of *Nature Magazine* to answer (in the teacher's proverbially garrulous manner) all of the frequent questions that writing students can ask. But I can answer, straightway, a small part of one question that these students always ask: "How do we find something to write about?"

"You can write about anything!" I want to scream for the ten thousandth time. This will not do, however. So the instructor soon learns to pick a few definitely important subjects for his writing assignments.

"Why not have my students write on conservation?" I asked myself in a fitful moment of searching for significant subjects. "My many 'city kid' students can especially benefit from a little extra study of this subject. And when they learn that they conserve themselves through the conserving of America's natural resources, a valuable lesson will have been mastered. Since the great conservation battle is not an exclusive fight for a few select science classes, I might as well lend a helping hand. After all, the English teacher—and all other kinds of teachers, for that matter—should find a way to share in this enormous responsibility."

Then, remembering the danger of overwhelming my students with such a vast subject, I broke the conservation topic into sub-topics that would be particularly meaningful to teen-agers here in southern California—oil, water, land, birds, fish, trees. . . .

Joyce Kilmer's poem, *Trees*, came to mind just as another session of the creative writing class began.

At the ringing of the tardy bell I stood up and waited a moment for silence. Then I asked the students to recite the well-known poem together with

me. When we finished, I suggested that we discuss the poem in order better to understand how it helps us to appreciate the beauty and usefulness of trees. After the discussion I requested that the students write, in prose or verse, something of their own that would similarly encourage readers to respect the functional and esthetic values of trees—and thereby cause these readers to develop a greater desire to preserve trees.

Happily, I offer the following student contributions, which demonstrate that the experiment was a genuine creative writing triumph.

## THAT SHOULD NOT BE!

Hiking over meadowland,  
Hiking where the flowers grow,  
On a tree I saw a band  
Of parasitic mistletoe.  
The tree, half dead, hangs very low,  
And will in time turn to decay.  
I do not blame the mistletoe—  
For that is part of Nature's way.  
But when a boy with ax in hand  
Comes marching through the meadowland,  
And stops to cut a youthful tree—  
That should not be!  
If only he could learn to see  
The beauty of a full grown tree,  
Then he would rather cut his arm  
Than have that beauty come to harm.

—Norman Feder

## ODE TO A FALLEN TREE

I stand in awe and watch the stately trees  
With branches lifted up to azure skies,  
Swaying gently in the evening breeze—  
A sight of grandeur for all human eyes.  
O master of the forest, I bow to thee:  
Thine age-old wisdom knows the pain of time;  
Were I to search the earth and all the sea,  
I'd never find a kingdom more sublime.  
The hand of God has molded you so well  
Thy beauty far exceeds all human ware;  
But when they came and cut you down, you fell  
To make a house . . . a book . . . a chair?  
They make of you coffins for dead men,  
Or firewood, or lumber at their will;  
The ecstasy you knew with lofty ken  
Was put to waste—but lingers with you still!  
And where's thy beauty now, O joyous pine;  
Where is the fragrance you so proudly owned?  
I wonder if you're now a lonely sign,  
Posted for hire, painted and loaned?

Remember the storms borne with your friends,  
The fires of man that passed you by?  
Those things are gone, they've had their ends;  
But the soul of a tree can never die.

—Ronald May

### SOME FOOL

He put his magazine down, and stared sulkily across the railing of the observation car. The train was going very fast. Still it would be two more hours to the city and to his business.

The vacation had been terrible. He wasn't used to vacations. The business was his goal in life, that and being mean to everybody.

He lit a cigaret and puffed nervously at it. Well, the scenery was nice, anyway. All those green trees and hills and streams. Shame they didn't have any trees around in his neighborhood. Well, what could you expect, with such a cheap penny-pinching city?

Those trees out there, though, they were the real thing. Their color schemes and shapes seemed to blend right in with those of the mountains in the background. And those clouds and the sky—well, they were the crowning touch.

He glanced at his watch and sighed. It was time to meet his wife in the diner. He flipped his cigaret stub over the railing and strode out of the car.

The ejected stub landed on a pile of dried leaves which had gathered beneath a tall, barren tree.

It was a day later, and the busy executive was finally back in his office. He had just completed bawling out his secretary, and he was now relaxing over his newspaper. Lighting a cigaret, he once more puffed nervously, trying to read. Then he frowned and grunted. "Says here that a possibly man-made fire has burnt out a large section of land in the eastern part of the state. Huh! Wonder what darned fool started that?"

—Bruce Belkin



## Apologies for a Vice

By A CONTRIBUTOR

**A**N AUTHOR who gained with his pen what he deemed a life worth living included in it free indulgence in blood sports. He averred that, "The first man was a hunter, a trapper, and a fisherman," and went on to say, "When man ceases to care for these things, or decries them, I fear he is either sick, a fool, or both." Our author seemed incapable of realizing that this bluster was really an apology and that his argument was very shaky. Who was the first man and when did he flourish? If we accept the findings of science, he was much nearer to the great apes than to any race of men known today. He was no hunter, trapper, or fisherman, as we envision such exploiters of the wild, for he knew not the use of tools. He was more or less omnivorous and doubtless devoured any small game, from the insect allies upward, that he could catch with his bare hands. He can hardly be held up to us as an example in behavior for he neither knew nor cared anything about cleanliness and sanitation.

Is there any virtue in imitating him—or any sense in a writer advising us to do so? Reverting to barbarism is no desirable thing even in the realm of sport. In many respects the evolution of man has been away from the cruelties of his racial childhood, but in this field we are urged to cling to the ways of the savage. There you have the issue, gentlemen of the chase, whether to be civilized in all respects, or while decent in some, to be atrocious in others.

Our sporting exponent of the "life worth living" taught his sons to imitate his concept of the "old Adam." Thus he wrote, "I believe in the gun for a normal boy. . . . It is not true that it makes him

cruel or selfish. Upon the other hand, its effects are just the opposite. He draws close to Nature, learns her laws, and feels the sweep of her elemental life. He kills only what is fit to eat and needed for food. Every element of his character is strengthened by the care, skill, patience, judgment, and zeal with which he follows game."

Every idea is this barbaric outburst is so subject to refutation that the embarrassment is only where to begin. That "needed for food" plea was utterly silly with respect to the family of this landed proprietor and in general does not apply anywhere in a civilized country. Certainly in the United States there is no dependence on game for food, and if there were, it could not be long, for with the game in hand the people could consume the entire supply in a day.

The Boy Scouts, the 4-H Clubs, the Future Farmers, and similar organizations have found ways to strengthen character that do not involve killing of wildlife. If a boy can be drawn close to Nature only through the medium of a gun, it were far better both for Nature and for him that there is no approach. Killing fellow creatures can have no good effect upon impressionable youth. How much better for him to learn of his kinship with wild animals, how to tame and be friends with them rather than to outwit and kill them. How much more kindly and admirable a man he would be.

Hunting has long been praised as training for war—good training for the most insensate and destructive of human activities—and this appraisal is a far truer one than any of the blood-ignoring sentimentalities spewed forth by hunter apologists.

# The School Page

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education, The American Nature Association

## A HAPPY NEW YEAR

**A**T THIS time of year we glibly wish all of our friends a Merry Christmas and a Happy New Year. We may do this without wondering what is really meant by merriment and happiness.

While this may be read on one of the colder days of the year, it is written on one of the hottest. The thermometer shows no hesitation whatever in going over the hundred mark, and yet I doubt if I have even seen any finer example of true happiness than I have just witnessed on one of the annual field trips of the American Malacological Union. True some of the leaders of the organization could not be there, but around a dozen lay members spent one of the happiest periods I have ever witnessed on a shell-collecting trip a few hundred yards from the Allegheny River. Meantime, hundreds of well-heeled citizens sat fanning themselves in Pittsburgh in air-conditioned rooms, complaining of the heat.

This dozen happy naturalists worked for more than two hours on a strip of land maybe thirty by fifty feet. One gentleman was so orthodox that he kept his coat on throughout the trip, even though it was completely saturated in perspiration after the first hour. It is doubtful if anyone in the group collected material that would exceed two oranges in volume. My wife came out of the trip with her hair dangling, a streak of mud across her face, and her stockings torn, but with a grin you could see a mile. They had discovered a new station for a rare species of land snail, and the eight-foot rotten log that yielded the first animal was literally completely destroyed by the bare hands of the collectors seeking other specimens. I could wish no one a happier, merrier time during this cold season of the year than was experienced by this group of field naturalists on what to most was probably the most uncomfortable day of the year.

Last winter, I led an all-night field trip when the temperature went far below zero. In the party was a Chinese girl who had never slept out a night in her life. When she woke the next morning, after having slept in the snow, she had the same merry, happy expression I witnessed on the faces of the shell collectors. So it is not time, or place, or luxuries, or the weather that makes for true happiness. It is learning to enjoy doing what has to be done when it has to be done. That is more or less what Aldous Huxley has said is the mark of the educated person. That is the kind of happiness I would wish to readers of this page.

There is, of course, the other side of the picture. There are colleagues on the faculty at Cornell who contend that they can do no worthwhile work unless some benefactor comes to their aid and showers them with all sorts of money. I have no intention of discouraging any benefactor, but worthwhile accomplishment and a happy professional experience should never

be dependent solely on outside help. While more may be done with assistance, less also may be accomplished if subsidy becomes too much a part of the picture. When the automobile created the hitch-hiker who came to believe that a privilege was a right, it set an unfortunate pattern for happiness for individuals and for groups of individuals. We have forgotten that it is more blessed and therefore happier to give than to receive, and, instead, seem to have developed a race of hitch-hiking citizens and nations that glory in weakness rather than in strength, and yell about freedom but shy from responsibility. I doubt if happiness can be attained by rewarding dependence, and wish no one a happiness that they may not have done their best to attain by their own efforts without penalizing others.

Not long ago I spent a few hours visiting the Pocono Wild Animal Farm just outside Stroudsburg, Pennsylvania. Within a fenced area of some three acres some sixty wild animals mingled freely with a good crowd of human visitors. When I came out I was sure that something new had been added to the zoo technique. Instead of having to stand back and look at bored animals within wire cages, I remembered, with a grin, my experiences with a rye cracker, a fallow deer, a Sitka deer, an Arizona white-tailed deer, two little donkeys and a number of other animals. When I sat down on a rock to rest, a goat from Asia came up and rubbed his head against my hands so that I took the hint and began rubbing his ears. An Italian visitor thought it would be funny to blow in the face of a llama only to be surprised at the way the llama returned the compliment. Everybody, including the animals, seemed to be having a wonderful time, and not at the expense of any other living creature. A few youngsters cried when deer came up to them, but usually within a few minutes they were on friendly terms and grinning happily where they had been crying disconsolately a few minutes before.

This little three acres of land, which on one day was a host to a thousand visitors, is one of the best examples I have ever seen of helping to break down the fears and misunderstandings that exist between man and some of the dumb animals. It should be visited by teachers, and anyone concerned with making others intelligently happy. The idea should have wider adoption. It gave me one of the happiest three hours of 1948, and I can only wish others a similar experience in 1949.

Of course anything that is worthwhile represents some effort on the part of somebody. The shell hunters got their fun largely because they had spent long hours studying shells before they turned themselves loose on that poor, rotten log. The wild animal farm is managed by persons who have had experience with wild animals and with dumb human beings, and they set the stage so that neither harms the other. In some ways, they have to lean over and make the greater concessions to the humans, but that is all right. There are many compensations, as well as many headaches, and the more people there are who have a good time in that park the happier are its managers. Everyone laughs at the antics of the donkeys, and at some of the paid visitors, as well. One young lady who called to a friend to come over and see the well-labeled brindled gnu asked her to see the "blinded gun," which reminds one of the zoo visitor who asked the keeper where he kept the lion cubes. The night spent in the snowbank by the Chinese girl was a happy one for her because of planning that had been done by those who administered the trip. Whether her happiness was greater than that of those who made her happiness (Continued on page 52)

## Buckeye Fruit

By T. W. L. SCHELTEMA

O bursting wealth of ripening buckeye fruit,  
How marvelous you are; how full of harmony,  
Revealing nature's laws, but partly understood.  
Not with the mind alone this opening canopy  
Should we behold. For, with a watchful eye  
We see the graceful lines of this protective skin,  
No longer needed when the life within  
Is ready to escape its cover; sure to die.  
Two seeds there are, as yet within the fold,  
But gaining strength to make the fatal step  
And fall again, to follow destiny  
Of nature's written course; eternal mystery!

# Camera Trails

By EDNA HOFFMAN EVANS

**G**REETINGS for 1949. First question on the agenda is: How are we going to initiate all that new camera equipment that we found under our respective Christmas trees?

In some ways winter is a fine time for Nature photography. Snow scenes are always good possibilities. There are many wild creatures to be photographed, even when the thermometer reading is well below the freezing point. There are tracks in the snow, winter bird residents gathered around a feeding tray, icicles, frost patterns, and many others.

But, in spite of the possibilities, outdoor winter photography is not as comfortable as it might be, particularly if the photographer happens to be a sun-worshipping southerner like myself. Last year, during the winter, I wrote about the possibilities of photography at the zoo. This winter, let us consider the possibilities to be found at the museum.

The old-fashioned museum was a dreary place. Row after row of cases, filled with stiffly posed, glassy-eyed, stuffed specimens made the place seem like a morgue—which, actually, it was. An Audubon might have found valuable information from such collections of skins and feathers. But then Audubon went into the wilds and met his living subjects in their own home territory.

Most museums are not like that any more. Habitat groups—artistic arrangements of wildlife posed against backgrounds so natural that one feels he can step into the case and walk miles and miles toward the distant horizon—have taken the place of those stuffed, stary-eyed specimens.

There is good camera hunting in such a modern museum. In fact, as at the zoo, a photographer can travel from arctic regions to the tropics, from desert lands to mid-ocean, simply by walking a few steps.

Of course, just as there were at the zoo, there are drawbacks to museum photography. At the zoo, the animal subjects were alive. But the problem of posing them against backgrounds consisting largely of fences, sheds and other unnatural objects was a difficult one to solve. The living subjects, too, were frequently far from cooperative.

At the museum problems are different. There is no need to

COURTESY CHICAGO NATURAL HISTORY MUSEUM



COURTESY CHICAGO NATURAL HISTORY MUSEUM

A photographer would have to travel a long distance to take this picture of a nesting quetzal in Honduras. Photographing a habitat group in a museum is much easier.

worry about backgrounds—they are as scientifically accurate as man can make them. The subjects—be they nesting quetzals in Honduras, gibbons in Malaya, an Asiatic ibex, or a Rocky Mountain goat—will remain posed indefinitely. If one shot fails, the photographer can come back tomorrow, next week, next month, or even next year and retake it. His subjects will not have moved an eyelash meanwhile.

Most museums welcome photographers, providing said cameramen comply with the necessary rules and regulations. The photographer should obtain permission from the museum officials before taking any pictures. There are several reasons for this. In the first place, certain of the displays may be copyrighted—as the work of one individual, or of a group of specialists, including a taxidermist, sculptor, artist, and others.

In the second place, the museum must protect itself in case of accident. Suppose your tripod slipped or one of your light reflectors fell against a case and smashed the glass. Somebody has to be responsible for such things.

In the third place, photographers and ordinary museum visitors do not mix very well. Both get in each other's way and frequently, as the slang expression goes, in each other's hair, too. From the photographer's viewpoint, it was bad enough at the zoo when some curious onlooker persisted in breathing down his neck and asking silly questions. At the museum, where spectators are apt to trip over extension cords, jiggle tripods and in general make nuisances of themselves, the problem is even worse.

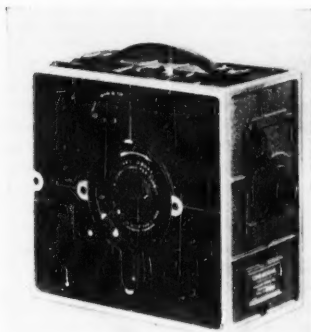
It is a long way to the gibbon territory of southeastern Asia. And, once on the ground, a photographer would have a long wait to get a picture like this. If museum photography may lack thrills it does get results.



To avoid this latter situation, the serious photographer can frequently obtain permission to take his pictures during hours when the museum is closed to the general public. Then he can work in peace, arrange and rearrange, shift and reset his equipment, as often as he likes.

There are some problems in museum photography that are not met with elsewhere. In so far as equipment is concerned, many different kinds of cameras will do the trick. Even a box camera can be used successfully by one who knows how. A camera that can be focused is better, of course, but it is not an absolute necessity.

A tripod, on the other hand, is of vital importance. Because of the light (or lack



This is the original Cine-Kodak Model A camera introduced by Eastman in 1923. Some 1,100,000 of its descendants are now in use by home movie makers. Model A weighed about seven pounds, was crank-driven, and has to be placed on a tripod for use. Today's spring-powered and far more flexible amateur movie cameras weigh only a third as much.

of it) and because there is no need to stop a mounted animal's movements, exposures can be made slowly. Indeed, most museum shots will be time exposures. Time exposures demand steadiness and a firm anchorage for the camera. No one can hold a camera steady enough to take a time exposure. In fact, few people can hold a camera steady enough for anything less than a 1/25th of a second shot.

It is possible, of course, to set one's camera on another case, or even on the floor, while taking time exposures. But, for general all-around satisfaction, for ease and variety of movement, a tripod best fills the bill. In making preparations for a museum photography trip, remember that floors are apt to be slippery. The metal points on tripod legs find no anchorage on smooth surfaces, be they tile, concrete, wood, or linoleum. Some sort of non-skid tips should be provided.

Lighting is always a problem in photography, winter or summer, indoors or out. Lighting in museums is particularly tricky. The modern ones employ indirect lighting, both in the rooms and inside

the exhibit cases. Indirect lighting is often misleading. Thus, the exposure meter will come in handy. If he has the equipment, and the museum authorities approve, the photographer can provide extra illumination in the form of reflectors and photo-flood bulbs. These must be carefully placed to avoid reflections in the glass of the case.

Because of reflections, flash photography is not too successful in museums. It is possible, of course, but in order to be certain there is no reflection, the photographer should first hold a flashlight in the place where his flash bulb will be. If there is no reflection, he can then shoot with confidence.

Placing of the camera itself is of prime importance. First, the photographer should select the point of view from which he wants to take his picture. Does he want to shoot from below, looking up at an angle? Or does he want to shoot down? Does he want a front view, or should the picture be taken from the side? Only by experimentation can these questions be answered.

Then, after selecting his point of view, the cameraman must think of reflections. From some angles he may find his own image reflected back to him from the glass front of the museum case. From other angles he may find highlights, glares, or other reflections that will spoil the effects of the picture. Such reflections can be avoided by setting the camera an inch or two out of square with the front



This is the "Tricoplat," a rotating stage device designed by E. Leitz, Inc., primarily for macro and micro photography. The three Leica cameras make it possible to photograph the same specimen in rapid sequence on color film, black-and-white, and reversible positive film.

of the case. This does not distort the focus, and yet in most cases it does eliminate reflections.

Finally, after all preparations are made, preparations that may take hours or even days, everything is ready. "Click!" goes the shutter and, in a few seconds, the exposure is made. All that work for a couple of seconds? Foolishness!

Well, scarcely. After all, it would take a great deal of time and a lot of money actually to photograph gibbons or giraffes, lyre birds or leopards, polar bears or penguins, in their native haunts. But at

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the museum you can do it. Try it sometime and see.

## ITEMS OF INTEREST

While it is now out of date, owing to the time lag between writing and publication of these sections, the fall number of *Leica Photography*, published by E. Leitz, Inc., contains an interesting article on taking Nature pictures with a Leica camera. The cover on the issue, titled "Running Free" and reproduced from a color photograph, would make any boat lover's blood tingle. It was taken from the bowsprit of a sailing yacht, looking aft past the jib and mainsail, with the foamy white wake and blue water stretching out behind. Ho, for the life of a sea-going cameraman!

While the apparatus is beyond the means or needs of most camera hobbyists, scientifically minded photographers may be interested in the "Tricoplat" copying attachment recently perfected by E. Leitz, Inc., chiefly for macro and micro medical photography. It is a set-up whereby three Leica cameras are mounted on a rotating stage so that specimens can be photographed in rapid sequence on color film, black-and-white film, and reversible positive film. The apparatus is a great aid to scientific study and teaching.

## HOME MOVIES

For those who like to observe anniversaries, the Eastman Company reports that home movies have crossed the quarter-century mark. It was back in 1923 that the company placed on sale, in New York City, the first complete 16mm motion picture outfit—including camera, film and projector—and announced the first amateur film processing service. Twenty-five years later the company estimates that there are now more than 1,100,000 families in the United States who own movie cameras. Of these cameras, some 325,000 are 16mm, while the 8mm models total approximately 775,000. Approximately 950,000 families, or nine out of ten owning movie cameras, also own a projector of some type. No estimate was given of the number of miles of film exposed in the last quarter-century but, no doubt, the figure is astronomical.

As for the future of home movies—the closing statement of the Eastman Company's report is a good way to end this first "Camera Trails" for the new year. The report concluded: "What advances there may be made in the next twenty-five years are not predictable but as long as scientific research continues there will be advancements. That is inevitable."

And so—time marches on, and photography goes with it.

## Forest Anniversary

Fifty years ago—in 1898—the Black Hills National Forest was created, and

this year a special celebration of this event has been held. This forest has participated in a number of "firsts" in the development and refinement of forest policies, and thus has contributed to the advancement of conservation on a national scale. In observance of this the United States Forest Service has brought out an attractive and informative 44-page bulletin entitled "Black Hills National Forest: Fiftieth Anniversary." It is a conservation document.

## MIRACLE AT ALTAMIRA

(Continued from page 24)

culture, and all together offering many chances for exchange of ideas.

Now we must consider a very recent and most important discovery in the cave of Fontchevade in Central France. For a long time, physical anthropologists have been moving toward the view that modern men, *Homo sapiens*, existed in Europe even before Neanderthal men, although the latter are more primitive anatomically. The Fontchevade finds, two skull fragments, are the first positive proof. For they belong to a fossil *Homo sapiens* type of man, and they were found in a cultural "horizon" below the Mousterian or Neanderthal, in the cave strata, and thus were older. Animal remains in the same level as the two skull fragments further confirm this, for the animals were "warm fauna" belonging to the temperate Third Interglacial period, long before the glacial times of Neanderthal men. The skull fragments were discovered by a highly capable French scientist, Mlle. Germaine Henri-Martin, daughter of Dr. Henri-Martin, excavator of La Quina.

So the answer to the cultural advances of Cro-Magnon men over Neanderthal men becomes more clear. Their type of men, *Homo sapiens*, is even older than Neanderthal in Europe. They had a weather advantage, a better physique; they were more numerous and thus had more opportunities to produce inventions, and they were exposed to many more types of culture.

And, of course, Cro-Magnon did not acquire his skill in art all at once. Some of his earliest drawings are mere wavering lines such as a child draws with his finger in the dust. Cro-Magnon's finger tracings, known as "macaroni" (which they resemble), are found on cave ceilings, too.

Significantly, some of his weapons are more elaborately etched with animal pictures than others. This would seem to mean Cro-Magnon believed some of his weapons were "lucky" pieces, and spent more time embellishing them. Baseball players, a notably superstitious breed, have their favorite bats. A single lucky kill with a spear could have given it an aura of magic, just as a single hole-in-one will endear a certain club to a golfer.

This, of course, is embryonic sorcery; and it is not hard to imagine how it would spread among primitive men. Quite naturally, one or two men in a Cro-Magnon group would show a special talent for decorating weapons. A few lucky kills with one of the talented fellow's weapons would quickly attract attention to the maker, opening the way for a deal. He would make "lucky" weapons in return for some of the better chunks of bison. Soon the artist, with more time on his hands since he did not have to hunt so often, would decide to add a little showmanship to his weapon-making. He invented a ceremony and a gruesome costume for himself. Pretty soon he had an "act", and he was careful to assure the sweaty hunters that mere luck was not the whole story of his fancy weapons. He became a very special kind of fellow, a sorcerer.

Dr. Henry Field, former curator of physical anthropology, Field Museum, recreates the scene for *Nature Magazine*:

A band of hunters are standing in a cave entrance watching a storm subside. Shall they begin the hunt now, or wait a day or two? It has been a week since fresh meat was killed, but no one wants to make any moves without consulting the "old man". Nor will he give a snap answer. "Wait until the women are asleep," he advises, "this is a man's business." By dark he has begun his incantations and hung a bag of magic charms about his neck. Tomorrow is the day, he decides, but the ceremony of the hunt comes first—tonight. Now he lights a torch, beckons to the hunters to follow.

They turn toward the back of the cavern, stooping, then crawling through constantly narrowing passages, finally to reach the inner sanctum, the chamber of ceremonies. The "old man" disappears for a moment behind a boulder, emerging in his ghastly costume, and begins his dance. His incantations become blood-chilling screams, and when the hunters are thoroughly terrified he suddenly raises his torch, disclosing the ghostly lines of a huge bison on the cavern ceiling. Now he thrusts a small, ivory spear into one of the young men's hands.

"Repeat after me," he cries, "as I strike you, so shall I kill the bison tomorrow."

The ivory shaft spins through the leaping shadows, strikes the bison's throat and impales in the painted clay. There is a brief shout from the hunters, and the old man begins to pray, fingering his bag of charms and being careful to put in a word for himself. Finally, he distributes cave-bear-tooth "charms" to be worn on the hunt, and the ceremony is done.

No, not quite. A few moments pass in the infinite horology of Mother Earth and another light appears in the ancient cavern. A man and a child enter; there are the muffled words of a strange, new language, and suddenly the cry:

"Toros, toros!"

## Fire Foil

This is the name given to an idea thought up by the Westrade Company, 400 Montgomery Street, San Francisco 4, California. It seeks to emphasize the threat of forest fires and to provide a means of helping to check them. In a small packet are several sheets of foil to be used as a means of extinguishing burning cigaret stubs. The idea is worked out so that business concerns or organizations would have their sales message printed on the packet containing the "Fire Foil." Anything that will help fight the causes of forest fires and call the public attention to the great losses they cause, is a step in the right direction.

## Border to Border

"This is a journey not only to the high places of the country but to the high places of life," says Joseph C. Wampler, archaeologist-mountaineer of 1940 Hearst Avenue, Berkeley, California, in announcing a trip along the entire Sierra Nevada-Cascade mountain crest, from border to border. This is something that has never been done. Space does not permit details of the trip, which is projected to start about April 1, 1949, but if you are interested Mr. Wampler will be happy to provide all information.

## National Park Travel

During the travel year that ended September 30, 1948, 29,608,318 people visited our national parks, national monuments and other areas administered by the National Park Service, according to an announcement from Newton B. Drury. Lake Texoma Recreational Area led the list with 2,397,508 visitors, and Lake Mead Recreational Area was second. Great Smoky Mountains National Park was the most visited park, and the Statue of Liberty the most popular national monument.

## Plant Check-List

"Check-List of the Vascular Plants of Maine" is the title of a 70-page booklet prepared by E. C. Ogden, F. H. Steinmetz and F. Hyland and published by the Josselyn Botanical Society of Maine. Copies are available from Dr. F. H. Steinmetz, Coburn Hall, University of Maine, Orono, Maine, for fifty cents. The list includes 130 families, 625 genera, 2018 species, 69 hybrids and 615 subspecific entities, and is intended as a forerunner to a Flora of Maine.

## Garden Plans

"Garden Plans for Low-Cost Homes" is the title of a practical little 20-page booklet available from the National Garden Institute, 598 Madison Avenue, New York 22, N. Y., for fifteen cents.



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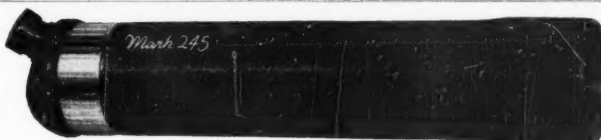
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Nationally known Rifleman JOHN O. MILLER, of 2506 1/2 Budlong Street, Los Angeles, says: "The Mark 245 Scope is far superior to anything I've ever used for spotting. That 45° angle eyepiece lets me spot my shots faster, check conditions without moving my face from my rifle. It's easy and comfortable to use, and my scores have actually been better since I got my Mark 245."

Write for Descriptive Catalog

Mention NATURE MAGAZINE when answering advertisements

## A KINGDOM FOR WILD HORSES

(Continued from page 12)

his campaign has been Wood's copyrighted picture of "Desert Dust," a wild Palomino. Thousands of prints have been sold, and orders still come from all parts of the world. Long ago, Wood lost the actual count. An enlargement, in oil, was presented as a gift to President Truman.

"Desert Dust" is considered one of the finest wild Palomino stallions ever to roam Wyoming. This regal leader, which had eluded wranglers and was named because of his uncanny ability to escape in a cloud of dust, was captured finally, three years ago, when an airplane was used for the first time in a chase.

Leading his band of eighteen mares and twelve colts, this stallion was forced into a trap in the Red Desert. But only because he trapped himself when he attempted to lead a three-month-old colt away from capture. He was surrounded by two rock cliffs, a precipice and men with lassos. He was shackled and taken into captivity. Being of such fine stock and blood, he was kept, and his colts are excellent examples of crossbreeding of wild and domestic strains.

"Desert Dust" was unusual in many ways, among which was the fact that at the age of five years he had a band of eighteen mares. Usually, at that age a stallion has no more than six. Horsemen believe "Desert Dust" must have met an older stallion, defeated him in combat and took over his band, thus enlarging his own.

When a young stallion first shows he wants mares of his own, he is fought out of the band by the older stallion. The outcast then turns to thievery. He hunts until he finds another band, sneaks in between it and a grazing mare at the outer fringe and literally drives her off and takes possession of her. The leader of the band, of course, will fight against such larceny, but he will not venture too far away from his other mares. Thus, if the younger one can drive off his captive fast enough, he has started his own band.

The same procedure is repeated until the young upstart has stolen as many mares as necessary to satisfy his possessive urge. Often he must fight it out with another young stallion with the same urge. Winner takes all.

There is much debate as to the origin of "Desert Dust." One theory is that he is the offspring of a Kentucky stallion that had been imported to Wyoming, and then escaped, with two mares, into the hills. Generally, wild horses of this area are believed to be descended from horses of the early Spanish settlers, or from those driven off by Indians before they attacked white men on their journeys to the West.

Verne Wood first became acquainted with wild horses through stories told by

his father, a Colorado settler, but his first experience with one was when he tried to ride it. "I did it because I wanted to dominate him," he reflected. "I learned more than I'd bargained for." His lesson was a six-month stay in a hospital from the injuries received.

After that he wanted to see them in their natural surroundings, observe their behavior and photograph them. He began making trips into the mountains, sometimes with a companion, more often alone. He travels as far as 250 miles from Rawlins on these trips.

During one airplane round-up, Wood and a friend were watching at timberline on Crooks Mountain. They came upon two young, stray colts several miles from the entrapment. Cornering the defiant youngsters in a cove, each man captured one. They roped them to a sheep ranch two miles away—and it was not an easy job. The next day, the men returned with a truck and hauled the colts to Rawlins.

Wood named his colt "Timberline" after the place at which he found it. "Timberline" now has his own little refuge in the open spaces at the west limits of Rawlins. There are no fences around him, but he does not run away. Wood furnishes plenty of food for him, and there is a shelter for the colt when he wants shelter.

"He eats sugar out of my hand," said Wood, laughing, "but if I try to pet him with the other hand he'll try to kick my head off. He doesn't want anybody to forget he's wild."

A regular visitor to see "Timberline" is Wood's eight-year-old daughter, who also loves wild horses. She is quite satisfied with "Timberline's" color-scheme too. The colt is jet black, with three white feet and a white blaze.

"He'll be free to go when he matures," Wood points out. "At least I'll know he'll be fit to return to the wild life he was born to."

Even though Wood hopes "Timberline" will not leave, what he is doing for the colt proves—in a small way—that he is practicing what he preaches.

## THE HEAVENS IN 1949

(Continued from page 42)

By the end of the year this distance will have decreased to about 114 million miles. It will remain throughout the year in the morning sky gradually increasing its distance above the eastern horizon until it is in quadrature, or 90 degrees west of the sun, on December 19. It will then rise about midnight and be on the meridian at sunrise. Fainter than a star of second magnitude at the beginning of the year, Mars will be as bright as a star of first magnitude in December.

Jupiter will be in conjunction with the sun on New Year's Day. It will not be seen until near the end of the month,

when it will be in conjunction with Venus on January 26. For some weeks it will be low in the southwest at sunrise, but will gradually improve its position and appear higher above the horizon, until, by early spring, it will be a fine Morning Star. On April 21 it will be on the meridian at sunrise and will rise before midnight, earlier on each successive evening, until, on July 20, it will be in opposition to the sun and visible all night. On October 17 Jupiter will be on the meridian near sunset, and by the end of the year will be found well over in the western sky at sunset. During the year, Jupiter will pass from Sagittarius into Capricornus. Its only conjunctions with other planets will be the two with Venus already mentioned.

Saturn will be the only planet well placed for observation in the evening sky in the winter and early spring, with the exception of Mercury's brief visibility around the time of its greatest eastern elongation in January, already referred to earlier. It will be visible all night at opposition to the sun on February 21, and will continue to be seen in the evening sky until a few weeks before its conjunction with the sun on September 2. It will pass to the morning sky on this date. On December 11 it will rise about midnight, and be on the meridian at sunrise. In 1948 Saturn spent most of the year in the constellation of Leo. At the beginning of 1949 the ringed planet is still in Leo, but is retrograding, or moving westward among the stars. On May 1 Saturn will again resume its direct, or eastward, motion. It will be at that time very close to the first magnitude star Regulus, in Leo, near which it was to be found so much of the time in 1948. By the end of 1949 Saturn will have advanced so far eastward in its orbit as to be nearly to the boundary between Leo and Virgo, although throughout the year it will have remained in Leo. Saturn will have, in addition to the conjunctions with Mercury and Venus, which have been mentioned in connection with these planets, a conjunction with Mars on November 30. This will be, like the conjunction of Venus and Jupiter in January, a very close one in which the two planets will appear like a double star, contrasting red and yellowish in color, and nearly equal in brightness.

## Heads Arboretum

Dr. Frans Verdoorn, managing editor of *Chronica Botanica*, has been appointed director of the Los Angeles State and County Arboretum at Arcadia, California. He will, however, continue in his present editorial work.

## ANSWERS TO QUIZ

a-12, b-19, c-10, d-20, e-9, f-13, g-18, h-1, i-17, j-8, k-7, l-5, m-11, n-16, o-2, p-3, q-6, r-4, s-15, t-14.



# THE READER'S MARKET

A place where members of the American Nature Association and readers of Nature Magazine may find many interesting offerings or may advertise themselves, at low cost, for things wanted; things they have for Sale, for Trade, for Sale or Trade. This is an excellent forum for acquiring or disposing of such items as binoculars, books, cameras and photographic equipment, magazines, sports and outdoor equipment, etc.

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1. *Transactions based on good faith:* Transactions are based on good faith and mutual satisfaction. Deliberate misrepresentation, disregard of usual business ethics or the attempt to circumvent these general requirements, when brought to our attention, will result in refusal of further advertising.

2. *All orders subject to these conditions:* We reserve the right to edit all copy to conform with our standards and to reject or discontinue any advertisement which we consider undesirable.

3. *Who may advertise:* This department is an open market trading post. Any individual or firm whose advertisement and methods of doing business meet our requirements may advertise their goods or services.

4. *Rates:* All classified advertisements must be accompanied by remittance. The rate is 15¢ per word including name and address—minimum charge \$2.00. Cash with order.

5. *How to count numerals, etc.:* Groups of figures are counted as one word. Abbreviations consisting of initials or single characters

likewise are counted as one word. Hyphenated words are counted as two words.

6. *"For Sale" ads must state prices:* A specific price must be stated on all FOR SALE ads—except that the phrase "write for catalog" may be used when listing real estate or merchandise in quantities.

7. *Conditions of trade or sale:* The condition of binoculars, cameras, instruments, other equipment useful to outdoor lovers, home-owners, etc., advertised for sale or trade must be specified as follows: PERFECT—meaning factory condition; EXCELLENT—meaning new condition, implying negligible amount of use; VERY GOOD—meaning practically new condition, implying little use, with no appreciable wear and only minor surface scratches or wear; GOOD—meaning moderate condition and with only moderate wear; FAIR—meaning no parts missing necessary to use, reasonable wear inside and out; POOR—meaning marred appearance or badly worn.

8. *Non-specific phrases barred:* Phrases such as "highest" or "top price paid", as well as any other so-called "auction-type" phrases are

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9. *Blind ads not acceptable:* Box number or blind ads will not be acceptable. Give your complete name and address to insure prompt delivery of all mail or telegraph replies.

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11. *The association will not accept for publication in NATURE MAGAZINE, advertisements of firearms, ammunition, or patent medicines.*

12. *Responsibility for illegible copy:* Type or print advertisement plainly as we cannot be responsible for errors due to illegible writing.

13. *Closing date:* The closing date of all advertisements is the 25th of the second month preceding month of issue.

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Nature Essays by Emerson Stringham: "KERRVILLE, TEXAS, AND ITS BIRDS," 1948 31 pages, 30¢; "WYOMING'S DEVILS TOWER, FORESTS AND TETONS," 1947, 32 pages, illustrated, 50¢; "MESA VERDE NATIONAL PARK," 1946, 15 pages, 30¢. All three, one dollar. Pacot Publications, Box 886, Kerrville, Texas.

"Bible and Science," 25¢. People's Christian Bulletin, Box 87, Cathedral Station, New York 25.

NATURAL HISTORY, Geology, Astronomy and Gardening Books, out-of-print. Free catalogues. Send Wants! John Johnson, Box 248, Mount Vernon, N. Y.

"Men, Monkeys and Missing Links," 25¢. Christian Evidence League, Malverne, N. Y.

### BULBS

CONIFER - LILY - RARE Seeds, Bulbs, Jade Orchid Cactus, House Plants, catalogue free. Ransom Seed Specialists, San Gabriel, Calif.

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INTERESTED IN BUTTERFLY BARGAINS, Rikermounts for school displays and collections? See our large display ad on page 547, Dec. issue featuring many great butterfly bargains. Butterfly Art Jewelry, 289-91 E. 98th St., Brooklyn 12, N. Y.

BUTTERFLIES: 20 large swallowtails of the World \$3.00. 20 United States including Giant Promethia and Zebra \$2.00. 15 Amazon tropicals including odd Glass-Wing \$2.00. 15 South American including Blue Morpho, Gorgeous Urania \$2.00. M. Spelman, 2781 Grand Concourse, New York 58, N. Y.

\$1.00 Bargain lots: different, while they last: 15 Native; 15 Peru; 15 India; 12 Australian; 13 Java; 10 African; 8 Cuban; 15 Brazil; 12 Key Islands; 15 Paraguay; 18 Colombia; 10 Exotic Papilios; 10 Tropical Insects; 10 Tropical Beetles; 15 Native Moths; 5 Exotic Moths; Morpho, Leaf, figure-8; Owl, Sunset-Moth; Map, Glasswing, Orange-tip; 75 exotics \$6.30; 25 Tropical Papilios \$5.00; 7 Morphos \$6.00; Postage 20¢ extra. Michael's, 7415 3rd Avenue, Brooklyn 9, N. Y.

### CAMERAS

200X TELEPHOTO camera easily made. Trifling cost. Telephoto lens and instructions \$3.00. Instructions alone 10¢. Suffolk Science Service, Box 808, Manorville, N. Y.

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BIOLOGICAL HOBBY CATALOG 10¢. Reptile Bulletin 5¢, 10 issues 50¢. Pair Hamsters \$2.75. Chameleon 25¢. Alligator \$2.50. Quivira Specialties, Topeka 20, Kansas.

### MISCELLANEOUS

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LEARN MAGIC, VENTRILOQUIISM, Mind-reading. Send for particulars. Quackerbush, Big Flats, New York

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### POEMS WANTED

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### RAINCOATS

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1214 16th St., Washington 6, D. C.

## DRAGONFLY MAN

(Continued from page 18)

visiting various university communities, making the acquaintance of their faculties and students, and seeing at first hand the scientific picture in a different land. His stay convinced him of the need for identification manuals that Chinese students could use in investigating the many kinds of creatures around them. Dr. Needham resolved to do his bit, and in 1930 published *A Manual of the Dragonflies of China*. This was received with such enthusiasm that he was awarded the Peking Society of Natural History's gold medal, established by a wealthy Peking citizen and mollusk specialist, Mr. Shot-su King, for the best work on the fauna of China.

Dr. Needham's students have much to remember him by. They are spread over the world, carrying on research work in biological fields for which many have become famous in their own right. A few who worked with Dr. Needham at Cornell are co-authors of technical papers. Two, J. R. Traver and Y. C. Hsu, are junior authors of *The Biology of Mayflies* (1935). Since his retirement from teaching, however, Dr. Needham has had more time to devote to his research and writing. The text of his particular study—a monograph of the dragonflies of North America—is now almost complete. It is a colossal undertaking, one such as few men have had the patience, persistence and good health to accomplish. Nor has its organization been by the exclusion of other interests. Dr. Needham had made time also for the presentation of a popular entomology, *Introducing Insects* (1940), of a commentary on the human species, *About Ourselves* (1941), and is at present putting the finishing touches on a textbook of animal ecology. He has spent a half year (1940) as Visiting Professor at the University of Puerto Rico, continuing his concern over students and over the extension of sound training in biology. This winter he had planned to return to the West Indies, no doubt to renew friendships and to check up on some dragonflies studied on the earlier visit.

We have known Dr. Needham for a decade or more, and have always admired his enthusiasm and vitality. But when we accompanied him on a field trip in the lake region of south-central Florida, he showed us things we had never suspected. All around us was a common dragonfly, named *Libellula needhami* by one of his admirers. Every now and then an even larger kind chased by, hawking after a mosquito or a gnat. One of these latter, Dr. Needham picked out of the air with a deft flick of his net. Then came the demonstration. He thrust a small branch into the earth, upright in front of a log in the sun. On the log, Dr. Needham settled himself comfortably, and held the big dragonfly in one hand by its wings

in such a way that its feet clasped the branch. With the other hand, he fed the always-hungry insect all manner of small grasshoppers and bugs. The dragonfly twisted its slender neck so that the complicated mouthparts could reach each morsel, and it chewed them up, one after the other. As long as its legs were supported, the insect kept on eating. But for us the marvel was in how rock-steady Dr. Needham held the dragonfly while we photographed it. An inanimate clamp could not have done as well. At less than half his age, our hands were far less precise in their movements. And Dr. Needham returned from the field trip fresh and chipper, while we were soft enough to feel tired!

Accompanying him out-of-doors, chatting with him in the laboratory and at meals, we gained much of the same inspiration that has shown up in Dr. Needham's students. Even his own children have found it contagious. Dr. Paul R. is now Director of Fisheries for the Conservation Commission of the State of Oregon, while John T. is Chief Ranger of Great Smoky Mountain National Park and has been so for many years. They must be intensely proud of their father, and marvel as we do at his energy, his purposeful activities, his perspective on biology, his knowledge of insects. Although the resemblance almost ends there, these characteristics are applicable also to the dragonflies he studies. Of all animals, few surpass the dragonfly in energy, in neat and deliberate movements, in ability to see widely and acutely over the land in which they live. They may range widely from the pond or stream in which they spend their younger stages, but they always come back to water as a homesite. Some of these insects, like Dr. Needham, even migrate from Ithaca to Florida for the winter. It is quite within the realm of possibility that a dragonfly, too common to attract his net in summer on Needham Place near the Cornell Campus, lives to see him again, stalking rarer prey, in the hammock-land near Sebring at Christmas time. Small wonder, then, that so many know Dr. Needham as "The Dragonfly Man."

## CHINESE VEGETABLES INTERESTING AND TASTY

(Continued from page 36)

Sanford, Florida.

The crops being grown were all of the Chinese type, including cabbage, melons, string beans, mustard, parsley, peppers, cucumbers, herbs. The tender things were being started in cold frames, the weather then being cool. In Florida are grown squash, snow peas, parsley, bitter melon, and the usual common Chinese

green vegetables. Considerable spinach is also grown at both farms.

There are, in all, about fifteen Chinese farms around New York. Twelve of these are joined in a cooperative with headquarters at 11 James Street, in New York's Chinatown. At least they are supposed to be, but several visits failed to raise anyone. Perhaps the crops were not in season, although the telephone was answered.

The Chinese people are that way. They are friendly but not talkative. A visit to the Chinese Chamber of Commerce got me nowhere, not even inside the door. Most of the Chinese organizations are social or business clubs. Some of them are known as "tongs", but tong wars no longer occur, and the residents of Chinatown are peaceful, prosperous, law-abiding citizens, in contrast with the shabby sordidness of the Bowery derelicts just around the corner at Chatham Square.

Try some Chinese vegetables in your garden next summer, or visit one of their quiet and pungent food stores. An interesting and pleasant surprise awaits you.

## THE SCHOOL PAGE

(Continued from page 45)

possible might be debated rather vigorously. And whether it is planning a shell-collecting trip on a hot day, or an overnight hike in winter, or a few acres where man and beast may become acquainted, the greatest happiness, I believe, comes from the one who sets the stage for such happiness. It is here that the teacher's opportunity lies; here that a discussion of this sort becomes appropriate on a school page. It is in this realm, too, that our newly elected government officers may render the greatest service and win the greatest personal happiness in this new year that is just ahead.

Probably the greatest reward I get for writing this page is the thought that I may be helping a few people, people whom I do not know and may never see, and people who every month write me saying that they feel they know me because of articles of mine they have read. In the last month, these people have asked me all sorts of questions, ranging from where they can get jobs to how they can market their trained earthworms, or keep an edelweiss from freezing this winter in a New Jersey garden. My garden is full of plants that have been sent me by persons whose only contact with me has been through the pages of *Nature Magazine*. These things do not just happen, but they more than pay me for the work I put into developing new material for the special inserts or for the school page. This is the sort of thing that makes me happy, and I can do nothing better than wish everyone else, also, a truly busy Happy New Year after a sanely Merry Christmas.

## Shelterbelts Success

When the idea was first advanced early in the 1930's, considerable fun was poked at the idea of planting tree shelterbelts in the prairie states. The September, 1948, issue of *South Dakota Conservation Digest* contains a report on this program that belies the foresight of the early skeptics, and the report is headed, "Shelterbelts are Proved Success." Some 220,000,000 trees were planted on 18,600 miles of shelterbelt, covering 238,000 acres. Some of the trees have by now reached a size and height that would permit culling out of the planting, although this plan was not a farm-forest project. Soil erosion by wind has definitely been lessened, drying out of the land slowed down, and runoff of water retarded. Bird life has increased, shelter for farm stock provided, farm buildings protected and living conditions improved. The shelterbelts have also increased the value of the land.

## Illinois Forest Plan

Approval of a long-range plan for Illinois forests that could add sixteen million dollars to the income of the farmers and lumbermen of the State was voted at the recent Illinois Forestry Congress at the University of Illinois. This plan would be activated through a representative committee of producers, users and conservationists, which is to be appointed, and which will work out the details of the type of organization needed to put the plan into effect.

## Audubon Field Notes

Undoubtedly many bird-minded readers are acquainted with *Audubon Field Notes*, published six times a year and covering fall migration, the Christmas bird count, winter season, spring migration, nesting season and breeding bird census. They are based upon reports of thousands of qualified ornithologists all over North America, and represent cooperation between the U. S. Fish and Wildlife Service and the National Audubon Society. Readers not acquainted with this publication should get in touch with the National Audubon Society, 1000 5th Ave., New York 28, N. Y.

## Saves Waste; Checks Pollution

Announcement of the solution of an eighty-year-old problem of the wood pulp industry is announced by the Weyerhaeuser Timber Company. The development permits recovery from waste pulping liquors of chemicals used in the production of sulphite pulp, and the derivation of steam and power energy from organic solids in solution. The result of this process will be to eliminate stream pollution caused by the discharge of waste liquors into streams.

## Bill Vogt Honored

Award of the Mary Soper Pope Medal for noteworthy and distinguished accomplishment in plant science to William Vogt, Chief of the Conservation Section of the Pan American Union and author of the book *Road to Survival*, is announced by the Cranbrook Institute of Science, Bloomfield Hills, Michigan. While Mr. Vogt is primarily known as an ornithologist, he has made notable contributions to the field of ecology. Indeed, his book draws its inspiration from the vital inter-relationships of vegetation, soil, water, wildlife and human well-being. Mr. Vogt is also an authority on the conservation problems of Central and South America, and was secretary-general of the recent Inter-American Conference on Conservation of Renewable Natural Resources.

## Animal Photographs

*Our Dumb Animals*, official publication of the Massachusetts S.P.C.A., announces its annual "Story-Telling" Photographic Contest, with awards for outstanding animal pictures. The contest closes June 15, 1949, and full details of the rules may be obtained from Contest Editor, *Our Dumb Animals*, 180 Longwood Ave., Boston 15, Mass.

## Heads Wildlife Research

Dr. Logan J. Bennett has been appointed head of the U. S. Fish and Wildlife Service's Branch of Wildlife Research. He has been with the Service since 1935, most recently as head of the Section of Cooperative Wildlife Research Units. Trained at Central College, Missouri, and Iowa State College, Dr. Bennett is widely known in scientific circles as a wildlife scientist and writer.

## Crop Ecology

With the science of ecology moving ever more rapidly into public thinking, the American Institute of Crop Ecology has been established, with P.O. Box 1022, Washington 13, D. C., as its address. This organization is devoted to research on problems of plant adaptation or introduction. A number of publications in this field are available, and a card to the address above will bring full information concerning the Institute.

## For Hawks

"Save Our Hawks: We Need Them" is the title of an excellent pamphlet available from the National Council of State Garden Clubs, 500 Fifth Avenue, Suite 2108, New York 18, N. Y. The pamphlet was prepared by Ellsworth D. Lumley, National Bird Chairman of the Council. It presents the hawk story concisely and effectively, and will, we hope, receive wide currency.



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## MARCH OF DIMES

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**JANUARY 14-31**

# Under the Microscope

By JULIAN D. CORRINGTON

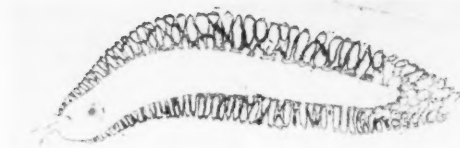
PHOTOMICROGRAPHS FROM SLIDES COURTESY WARD'S NATURAL SCIENCE ESTABLISHMENT, INC.

## THE USUAL SPONGE

FROM several standpoints, sponges are the most curious of all animals. In the first place they are all sessile, which is to say fixed or rooted to some object, and all are aquatic. Most of them are colonial, consisting of masses that represent separate individuals fused together, and all but a single freshwater subfamily are marine. The obvious openings, each of which receives the name *osculum*, meaning mouth, are not mouths or incurrent openings at all but are excurrent, carrying water and included wastes out of the body; this is, to be sure, a unique feature.

In our hectic, present-day educational program there is no time in which to study even a single example of sponges in most of our high school and college courses in biology and general zoology. The old leisurely browsing course that poked its way from phylum to phylum through a whole year of instruction, paying scant heed to anything save morphology and evolution, has given way to the efficiently bustling one-semester drive on physiology and genetics, and out the window have gone all the musty sponges and starfishes and the naturalist-hobbyist perusal of mollusks and spiders and fishes. Unquestionably the new emphasis is the better in that it provides an experimental approach that enables research to progress, and stresses matters of greater applied importance with regard to our own bodies and minds and society, yet while students today acquire a great deal of information that was unknown until recent times, they also lose much that has been crowded to the sidelines. Only if he has the opportunity to enroll for advanced work with invertebrates, or in marine biology, does the embryonic Agassiz of the 1940's learn about the many kinds of sponges and their strange ways.

Generally speaking, then, this discarded bric-a-brac remains something described in the textbooks, but, if the laboratory schedule permits, a single example is considered, and the usual sponge is referred to as *Grantia ciliata*. And that is odd, as the *Walrus* and the *Carpenter* would inform Alice, because, you know, there isn't any *Grantia ciliata*, although one combs Greenland's icy waters or India's coral strand. This species is confined to the listings of supply house catalogs and the pages



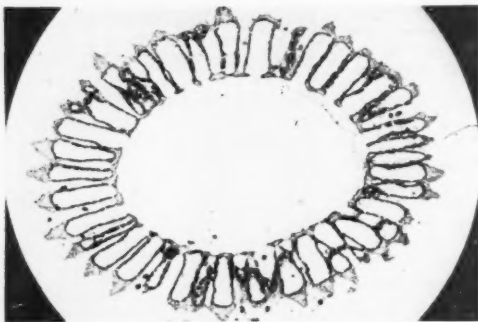
Longitudinal section of *Scypha*, 18X.

of zoology textbooks and laboratory manuals.

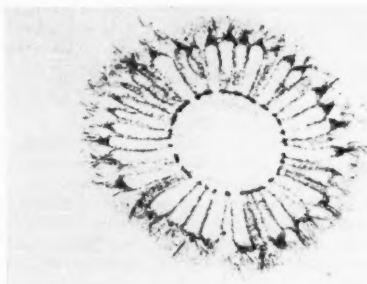
Back in 1871 the U. S. Fish Commission published an important paper by A. E. Verrill, well-known Yale professor, *Report upon the Invertebrate Animals of Vineyard Sound*, containing the description of this species. Now it turns out that Verrill was mistaken and the form in question does not belong to the genus *Grantia* at all, but instead to *Sycon*, a type known from Europe for centuries. In 1936, de Laubenfels showed that *Sycon* is the wrong word, the correct name being *Scypha* (cup). But science has its conservative as well as its progressive side (Aristotle be praised), and biologists are slow to adopt recommended changes in nomenclature. So in the 1948 printing of Pratt's *Manual of the Common Invertebrate Animals*, we observe that progress has been made to the point of cataloging this species as *Sycon ciliatum*, and it will take a later edition to catch up with *Scypha*. Most texts, catalogs, and the like use the still more obsolete *Grantia*, which has the justification that most teachers would not know the animal meant should you ask them the identity of *Scypha ciliata*.

But, as Juliet discovered, there is more to an organism than its name, and *Scypha* by any other name would still be a small, solitary, vase-shaped, flimsy and inedible marine creature that displays the cellular level of organization. In a colonial protozoan the somatic or body-wall cells are all alike; each must be a Jack-of-all-trades, capable of performing every function save reproduction. The green alga, *Volvox*, is most often used to illustrate this kind of construction. The sponge has progressed further, to the point of division of labor among these somatic cells so that each does only a limited portion of the work. They are not further perfected into tissues, however, as occurs in Coelenterates, the next higher group, as is best shown by a startling experiment.

In 1910, H. V. Wilson described experiments in which he passed sponges through fine bolting silk so as to dissociate the cells, an act guaranteed to kill any multicellular animal—or so it was thought. But the separated cells crept about on the bottom of the receiving dish of water and were organized anew by certain primitive mesenchymal cells termed *archeocytes* (ancient-cells) into aggregates that, after several months, developed spicules, canals, flagellated chambers, and other characteristics of their species, and proceeded to grow into adult sponges.



Thick section showing only spicules, 18X.



Stained cross section of *Scypha*, 40X.



If a section is made through *Scypha*, either lengthwise or crosswise, the body wall is seen to be folded like an accordion. Every alternate fold is a *radial canal*, opening to the interior by an *internal ostium* (formerly termed apophyle; terminology followed here is that of Hyman). Between any two radial canals is one that opens to the exterior through a *dermal ostium* or *dermal pore* (incurrent pore); this is the *incurrent canal*. Not shown in the photomicrographs are the numerous minute pores that connect these parallel series of canals, allowing water to flow from an incurrent canal through the wall and into the radial canal, and called *prosopyles*. After leaving the internal ostia, water passing through the sponge's body enters the single large internal cavity, the *spongocoel*. This is Dr. Libbie Hyman's term for a chamber that has been variously called gastral cavity, cloacal cavity, paragastric, and other designations that reflect the fact it cannot be identified with any of the several internal cavities of other animals. From the spongocoel, water flows outward through the osculum.

If one could grasp a strip of *Scypha*'s body wall at each end and pull so as to flatten out the accordion pleats, producing a flat piece, there would be no canals but merely a body wall perforated by the prosopyles. Such is the condition in the most primitive of sponges, as represented by *Leucosolenia*, several species of which occur on our coasts. The prosopyles are then termed simply ostia or incurrent pores. This condition, basic even for the largest and most complex sponges, furnished an appropriate name for the phylum, the Porifera (pore-bearing). The simplicity of the body wall prompted the appellation *asconoid* (bladder-like) for these lowest sponges, formerly placed in an order called the Ascones. Each pore is an opening through the cytoplasm of a single cell, the *porocyte*, which extends from outer to inner surface.

*Scypha* is an example of the *syconoid* (fig-like) construction, with folded body wall resulting in alternating canals. Proceeding toward more advanced sponges, the third and highest type of canal system is the *leuconoid* (white-like, a poor term) with branching canals and saclike chambers, mostly derived through a larval construction known as *rhagonoid* (berry-like).

The key cell type in these various canal systems is the *choanocyte* or collar cell. There is a flagellum proceeding away from the free surface, its base surrounded by a transparent collar. It is these cells that create the current that sets through a sponge, although they do not beat in unison or in waves. The older idea was that these collar cells ingest food and nourish themselves, then pass on the excess to wandering cells or *amobocytes* of the *mesoglaea*—"middle glue"—said to be a non-cellular jelly-like stratum between the outer *dermal epithelium* and

the inner *gastral epithelium*. The sponge body was held to consist of but two layers of cells—the germ layers of embryology—ectoderm and endoderm, and such a creature was said to be diploblastic.

Today the conception of sponge architecture has changed considerably. The dermal and gastral layers cannot successfully be identified with the ectoderm and endoderm of higher phyla, and these terms have been dropped as regards the Porifera. Likewise the diploblastic idea, for the third germ layer, or mesoderm, is present in the primitive condition, just as in early embryos of higher animals. It is termed *mesenchyme* (middle-infusion) and contains large numbers of separate cells, including archeocytes, amobocytes, the germ cells and, notably, the *scleroblasts*, those cells that manufacture the spicules or spongin fibers that constitute the skeleton of sponges, and on whose characteristics the primary classification is based. These spicules were the subject of our feature article for the June-July 1946 issue.

In large and massive sponges it appears that food particles—microscopic organisms of all sorts, organic debris, and dissolved nutrients—pass through or between the collar cells and are digested in the amobocytes, which distribute the products and so serve as a primitive circulatory apparatus. Thus the collar cells are large and have the functions of current-production and digestion in primitive sponges, as *Scypha*, but become smaller and more specialized in higher types, losing the digestive function. In asconoid sponges the entire gastral lining of the spongocoel is made up of choanocytes; in syconoid species, these cells are limited to the radial canals (flagellated canals); and in leuconoids they are still further restricted to the flagellated chambers.

The outer cells of sponges are mainly flattened epidermal cells called *pinacocytes* (tablet-cells). These come to occupy the free surfaces wherever the choanocytes have vacated by withdrawing to more and more restricted sites. Accordingly, in *Scypha*, the incurrent canals and spongocoel are lined with pinacocytes as well as the exterior surface; in higher sponges, all the larger canals and cavities. They are very contractile and can alter the size and shape of parts as may be permitted by the spicules. *Myocytes* resemble smooth muscle cells and are arranged to form sphincter muscles around oscula, which slowly close when adverse conditions prevail.

Sponges have evolved from some colonial type of protozoan, possibly from a choanoflagellate species, the collar cells of both groups being strikingly similar. The simplest sponges are very small and frail. *Leucosolenia* sends forth horizontal branches that creep over rocks and produce upright, vase-shaped individuals. The usual *Scypha* is a solitary sponge, from half to one inch in length, and received the specific name *ciliata* because

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of the presence of a collar of long monaxon spicules surrounding the osculum. These and related genera are members of the Class Calcareae, whose spicules are calcareous—made of calcium carbonate or lime.

The Class Hexactinellida comprises the glass sponges, mostly deep-sea, both solitary and colonial, and with siliceous or glassy spicules of three crossed axes (triaxon) so that they have six rays, or multiples thereof.

By far the greatest number of sponges belong to the Class Demospongiae (sponge people), where the spicules, if present, are siliceous but not triaxon, most often monaxon or tetraxon, and in which spongin, another kind of skeletal material, organic and allied to horn and silk, is often present, with or without spicules. The finger sponge (*Chalina*) has both spicules and spongin, and would take the hide off the bather so foolish as to try this species, or scratch the polish on the new convertible. The valuable sheepswool sponge (*Hippospongia gossypina*) is of commercial importance because it has soft spongin fibers only.

In the Demospongiae one finds also the commercially harmful boring sponges that destroy oysters, boring their way through thick shells by some process not understood, an example being *Cliona celata*, the sulphur sponge. The freshwater sponges, such as *Spongilla*, are Demospongiae. Other groups within this class include massive, irregular colonies of many shapes and colors, some erect, other incrusting. There is even one order, the Myxospongia, of small, soft, and incrusting sponges that have no skeleton at all. About three thousand living species of sponges are known and fossil remains, chiefly as spicules, are abundant.

Recognition of the true nature of the sponge and its cell types has slowly evolved through many centuries. Aristotle thought that sponges were animals, but he called attention to the similarities they share with plants. Down to a period less than one hundred years ago, the argument see-sawed as to whether they were plants or animals, some writers trying to solve the problem by straddling the fence and claiming they were both. The sessile habit, plant-like growth, and lack of mouth and of any sign of a nervous system all inclined the observer to regard sponges as plants. On the other hand, details of appearance, texture, colors, and methods of growth are not plant-like, nor are there flowers or fruiting bodies.

In 1765 Ellis discovered the currents of water that flow through a sponge, and the slow movements that open and close the oscula, and called them animals. The big three in zoology for the century following—Linnaeus, Lamarck, and Cuvier, each an author of a basic scheme of classification—all considered sponges as animals, placing them with one or another type of polyp. Robert E. Grant, in 1825, found the incurrent ostia and demonstrated the current going in through these openings and out the oscula, stating that it was produced by the action of cilia. In 1836 he named the group Porifera. H. J. Clark first described the choanocytes in 1866, and in 1878 the first embryological study was completed by F. E. Schulze, followed by work on this subject by several others for the next twenty years.

By the decade 1860-1870 the animal nature of sponges was more or less generally conceded and investigators concentrated on schema attempting to relate them to other animal groups. One by one such attempts failed. Even as far back as 1875, Thomas Henry Huxley advocated removing sponges from the Metazoa, a group term meaning "animals beyond," designed to separate all multicellular animals from the single-celled protozoa. In 1884 Sollas proposed the name Parazoa, the sideline animals, for sponges, thus dividing the animal kingdom into three unequal subkingdoms, Protozoa, Parazoa, and Metazoa. Some authors follow this excellent scheme, but the majority render it lip service and go on placing the sponges under the Metazoa.

Slide preparations include both cross and longitudinal sections. A composite slide, with both kinds of sections on a single slide, is excellent. Kleinenberg solution is a good fixer: 100 parts distilled water, 2 parts sulphuric acid, picric acid crystals

to saturation. After six to twelve hours, as best suits your working schedule, wash with warm 70% alcohol, 100 parts, pure nitric acid 5 parts, to decalcify the spicules. After several hours, wash out this mixture with 80% to 85% alcohol to which has been added a quantity of precipitated carbonate of lime, roughly 5%, to neutralize the acids. Renew this fluid and continue washing until it fails to give an acid reaction with litmus. Complete dehydration and proceed to imbedding and sectioning in the customary manner. Stain sections with any desired combination. Congo red and anilin blue have been used for collar cells. Nigrosin, picro-nigrosin, brazilin, indulin, and various carmines have all been recommended by different workers, choice of stain depending mainly on the particular type of cell stressed; hematoxylin is a good general stain.

One of our illustrations shows an unstained section made without decalcification and then treated with 10 per cent potassium hydroxide to dissolve away everything but the spicules. If cut thick, as 50 micra, such sections are very instructive as to the manner in which these microscopic bits of masonry serve as a skeleton. Siliceous spicules are acid-resistant and may be cleaned either by potashing or with an acid.

## REVIEW

Linus Paulding's *General Chemistry* is a far cry indeed from the sort of text that was current when we were initiated to the mysteries of the subject. Observe, from the Preface: "every boy now knows about atoms, and accepts them as part of his world—they are split in the atomic bomb and in the comic papers, they stare at him from advertisements." Again: "The progress made in recent decades in the development of unifying theoretical concepts has been so great—that the presentation of general chemistry to the students of the present generation can be made in a more simple, straightforward, and logical way than formerly."

These excerpts point up the plan of this handsome volume, which begins with an explanation of matter; atoms, molecules, and crystals; elements and compounds. The periodic law follows. The reader is then conducted through discussions of weight relations in chemical reactions, ions, valence, electrolysis, and electronic structure. Examples of oxidation-reduction reactions appear early, and not until Chapter 11 does a group of elements come up for survey. Successive groups form the basis for treatment of such subjects as gases, solutions, equilibrium, and organic chemistry, the work ending with a chapter on radiochemistry.

Not only is this an excellent text for the chemistry major; the need of integrated chemical knowledge in the other sciences, as biology, is a part of the picture, as also the explanation of chemistry to the non-science student and the unsupervised reader. The illustrations are all new and strikingly modern, adding much to the effectiveness of the book. Pp. vii, 595; figs. 117. W. H. Freeman and Co., 549 Market St., San Francisco 5, 1947. \$4.25.

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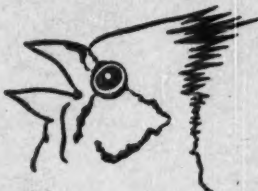
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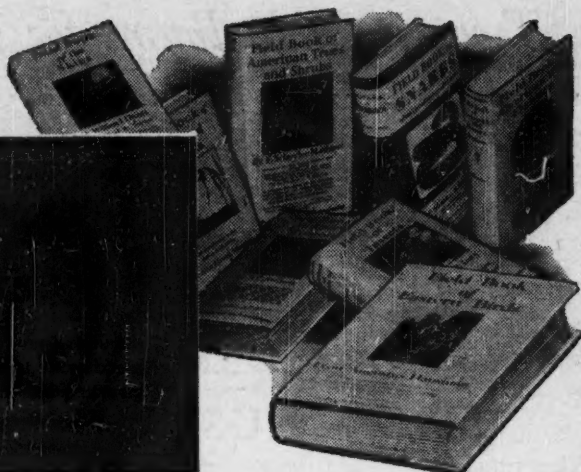
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